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CEREMONIES UPON THE COMPLETION OF THE MONUMENT

ERECTED BY THE

PENNSYLVANIA RAIL ROAD COMPANY

AT BORDENTOWN, NEW JERSEY.

TO MARK THE FIRST PIECE OF TRACK LAID BETWEEN NEW YORK AND PHILADELPHIA IN 1831

NOVEMBER TWELFTH 1891

ADDRESS OF PRESENTATION

Assistant

ADDRESS OF ACCEPTANCE

General

HISTORICAL ADDRESS

The

Curator

U.

SIDNEY & ROBERTS WASH'N D.C.

CONTENTS.

	Page
Description of the Monument,	iii
Officers of the Pennsylvania R. R. Co., 1891,	v
Ceremonies at the Celebration, Nov. 12, 1891,	1
Address of Presentation by Joseph T. Richards, Asst. Chief Engineer,	2
Address of Acceptance by F. Wolcott Jackson, Gen. Supt. U. R. R. N. J.	4
Historical Address by J. Elfreth Watkins, Curator, U. S. National Museum,	7
Resolutions of Bordentown City Council,	64
Report on Preliminary Survey Camden & Amboy R. R. by Maj. John Wilson, 1830,	65
Semi-Centennial, Pennsylvania R. R. by J. Elfreth Watkins,	73
New Jersey R. R. and Transportation Co.,	85
Philadelphia and Trenton R. R. Co.,	87
Trenton Bridge Co.,	89
Associates of the New Jersey Co.,	90
Length of Railroads in New Jersey Controlled by Pennsylvania R. R. Co., 1891,	91
Letters to and from John Stevens Concerning Railroads in Pennsylvania and New Jersey,	93
Newspaper Comments Concerning the Celebration,	95
Organization of the Baltimore and Susquehanna R. R.,	101

ILLUSTRATIONS.

Pennsylvania R. R. Monument at Bordentown,	Frontispiece
Bronze Tablet,	facing page ii
Chesterfield Plan,	" iv
Fac-Simile of Invitation to Ceremonies and Program,	" 6
Fac-Simile of Letter of Robert L. Stevens Ordering the First Steam Rail, Containing Cross Section and Plan,	" 29
Ross Winans and the Locomotive "John Bull,"	" 34
Camden, Railroad Arch at Bordentown, and Trenton Bridge, 1844,	" 42
Railway and Jersey City, 1841,	" 44

PENNSYLVANIA RAILROAD MONUMENT AT BORDENTOWN, N. J.

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CEREMONIES UPON THE COMPLETION

OF THE

MONUMENT

ERECTED BY THE

PENNSYLVANIA RAILROAD CO.

AT

BORDENTOWN, NEW JERSEY,

TO MARK THE FIRST PIECE OF
TRACK LAID BETWEEN NEW
YORK AND PHILADELPHIA, 1831,

NOVEMBER 12, 1891.

PUBLISHED FOR THE PENNSYLVANIA RAILROAD CO.
BY GEDNEY & ROBERTS,
WASHINGTON, D. C.

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FIRST MOVEMENT BY STEAM ON A RAILROAD IN THE STATE
OF NEW JERSEY, NOVEMBER 12, 1831, BY THE ORIGINAL LOCOMOTIVE
"JOHN BULL" NOW DEPOSITED IN THE UNITED STATES NATIONAL
MUSEUM AT WASHINGTON. THE FIRST PIECE OF RAILROAD TRACK IN
NEW JERSEY WAS LAID BY THE CAMDEN AND AMBOY RAILROAD
COMPANY BETWEEN THIS POINT AND THE STONE, THIRTY FIVE
HUNDRED FEET EASTWARD IN 1831.

BRONZE TABLET.

RAILROAD MONUMENT, AT BORDENTOWN, N. J.

Cast by John Williams, New York City.
Model by Theodore A. Mills, Washington, D. C.

THE RAILROAD MONUMENT

AT

BORDENTOWN, N. J.

EXCHANGE

The Railroad Monument at Bordentown, erected by the Pennsylvania Railroad Company, was completed in 1891. It is composed of a cube of Baltimore granite, five feet square and seven feet high, supported upon an octagonal foundation composed of the stone blocks upon which the iron rails were originally laid in the tracks of the Camden and Amboy Railroad. Around this cube is a circle composed of two of the original iron rails with which the road was first laid. These rails are supported by stone blocks according to the original practice, the spikes and joint fixtures also being from the original track. This type of rails, which is now known throughout the world as the "American Rail," was designed by Robert L. Stevens for and first laid upon the Camden and Amboy Railroad in 1831. Sunk in the south side of the granite block is a bronze tablet, which contains a representation (carefully drawn to scale), in relief, of the locomotive "John Bull," with tender improvised from a freight truck with tank consisting of a whiskey hogshead and the two passenger cars that first did service in the State of New Jersey in 1831.

The tablet contains the following inscription in raised letters:

FIRST MOVEMENT BY STEAM ON A RAILROAD IN THE STATE OF NEW JERSEY, NOVEMBER 12, 1831, BY THE ORIGINAL LOCOMOTIVE "JOHN BULL," NOW DEPOSITED IN THE UNITED STATES NATIONAL MUSEUM AT WASHINGTON. THE FIRST PIECE OF RAILROAD TRACK IN NEW JERSEY WAS LAID BY THE CAMDEN AND AMBOY RAILROAD COMPANY BETWEEN THIS POINT AND THE STONE, THIRTY-FIVE HUNDRED FEET EASTWARD, IN 1831.

Upon the east side of the block cut into the granite are the words

"CAMDEN AND AMBOY RAILROAD, 1831,"

and on the west

"ERECTED BY THE PENNSYLVANIA RAILROAD COMPANY, 1891."

The design, drawings and specifications of the monument were prepared by Dr. G. Brown Goode, Assistant Secretary of the Smithsonian Institution; Mr. J. Elfreth Watkins, Curator of the Section of Transportation and Engineering, United States National Museum, Washington, and Mr. Joseph T. Richards, Assistant Chief Engineer, Pennsylvania Railroad Company. They were approved by the President, Vice-Presidents and General Manager of the Pennsylvania Railroad Company, and the construction was authorized by the General Manager.

In the work of construction and in the collection of old track material Mr. Richards was zealously assisted by Mr. Robert P. Snowden, Assistant Engineer of the Amboy Division, and the corps of employés under his direction. This work, begun in 1886 under the administration of Superintendent W. N. Bannard, was completed November 11, 1891, Mr. Frank Ellmaker being at that time superintendent of the Amboy Division.

The tablet was cast by John Williams, of New York City, from a model by Theodore A. Mills, of Washington, D. C.

CONSTRUCTION PLAN
OF THE
P. R. R. STONE MONUMENT
NEAR BORDENTOWN N.J.
ON LINE OF CAMDEN & AMBOY R.R.
NOVEMBER 1890-1

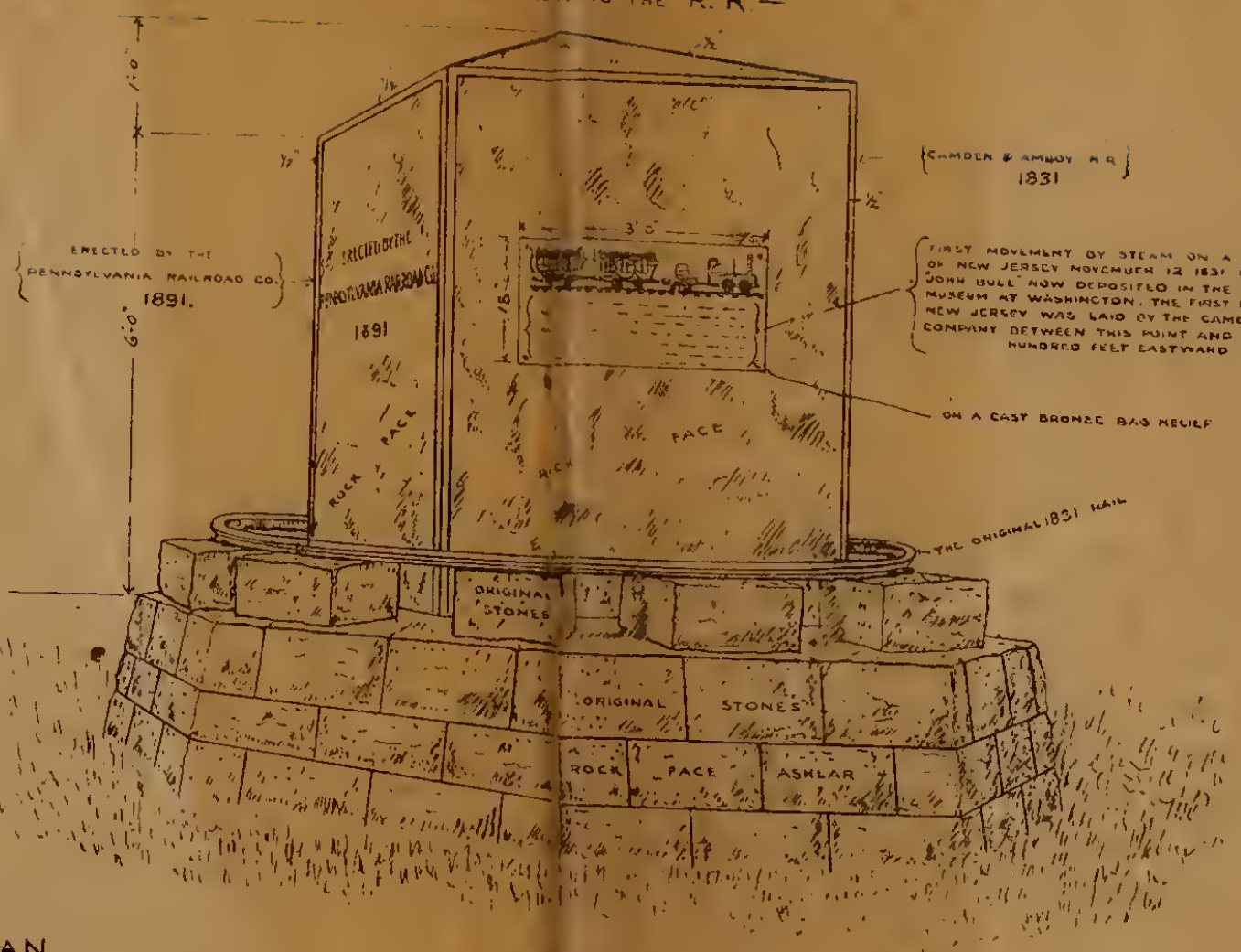
Respectfully Submitted

Joseph T. Richards
Asst. Chief Engr.
P. R. R. Co.

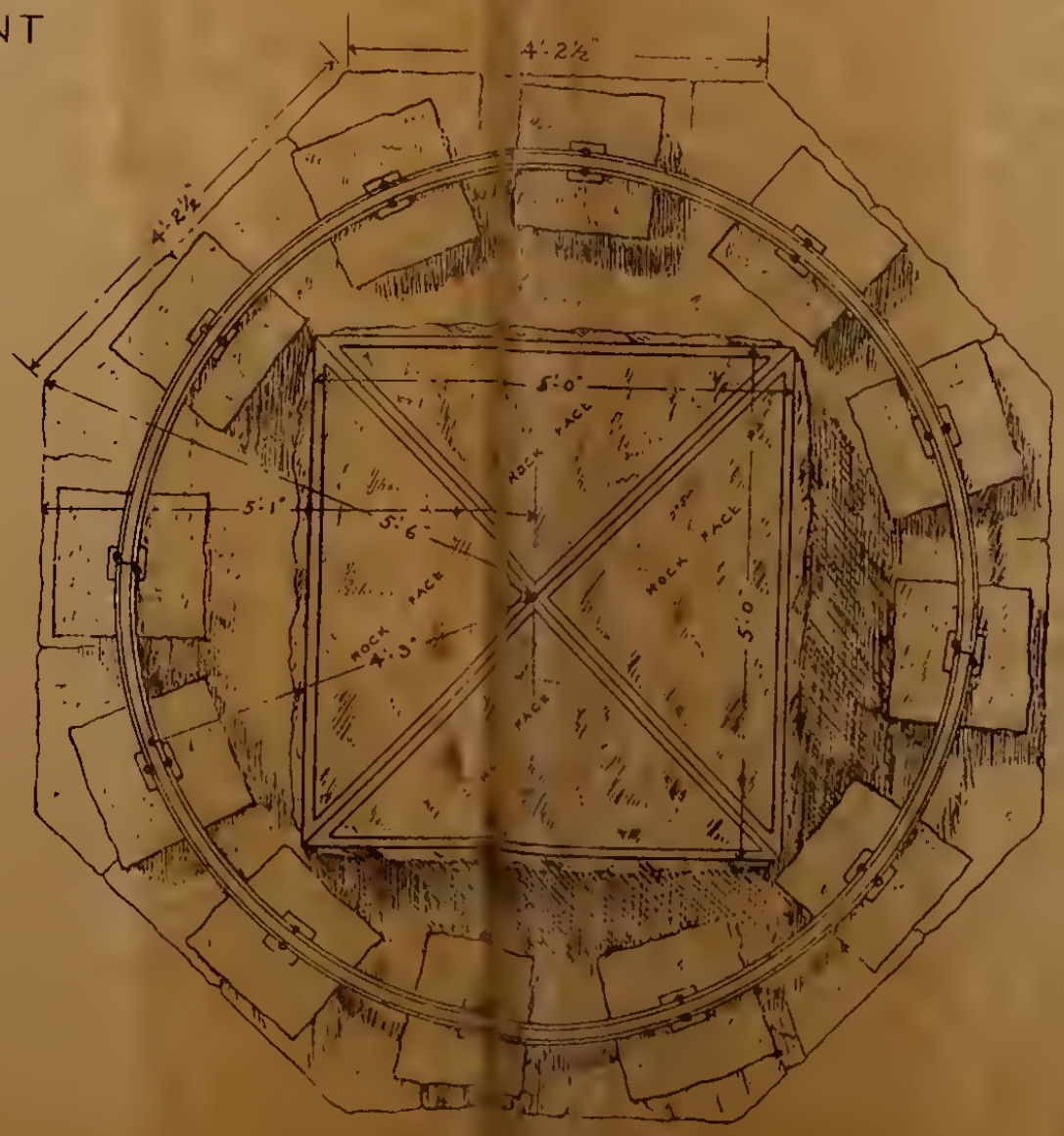
APPROVED

GENERAL MANAGER.
P. R. R. Co

— FACE NEXT TO THE R. R. —

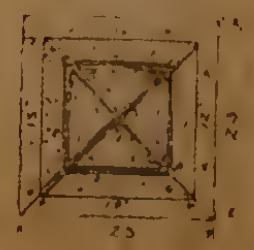

ERECTED BY THE PENNSYLVANIA RAILROAD CO. 1891.
CAMDEN & AMBOY R.R. 1831
FIRST MOVEMENT BY STEAM ON A RAILROAD IN THE STATE OF NEW JERSEY NOVEMBER 12 1831 BY THE ORIGINAL LOCOMOTIVE "JOHN BULL" NOW DEPOSITED IN THE UNITED STATES NATIONAL MUSEUM AT WASHINGTON. THE FIRST PIECE OF RAILROAD TRACK IN NEW JERSEY WAS LAID BY THE CAMDEN AND AMBOY RAILROAD COMPANY BETWEEN THIS POINT AND THE STONE THIRTY FIVE HUNDRED FEET EASTWARD IN 1831
ON A CAST BRONZE BAS RELIF
THE ORIGINAL 1831 RAIL
ROCK FACE
ORIGINAL STONES
ASHLAR
3'-0"
6'-0"
1'-0"

No. 1



— PLACED AT THE EAST END —
— OF THE SECTION OF TRACK —

No 2



OFFICERS OF THE PENNSYLVANIA RAILROAD COMPANY.

ELECTED BY THE BOARD OF DIRECTORS, MARCH, 1891.

President,	GEORGE B. ROBERTS
First Vice-President,	FRANK THOMSON
Second Vice-President,	J. N. DU BARRY
Third Vice-President,	JOHN P. GREEN
Assistant to Second Vice-President,	JOSEPH U. CRAWFORD
Secretary,	JOHN C. SIMS
Assistant Secretary and Sup't Employés Saving Fund,	D. S. NEWHALL
Treasurer,	ROBERT W. SMITH
Assistant Treasurer,	GEORGE E. PEABODY
Cashier,	BENJAMIN F. CRAWFORD
Comptroller,	ROBERT W. DOWNING
Assistant Comptroller,	M. RIEBENACK
General Freight Agent	W. H. JOYCE
Assistant General Freight Agent,	C. A. CHIPLEY
Manager of Empire Line,	GEORGE M. BALL
Manager of Union Line,	D. S. GRAY
General Passenger Agent,	JAMES R. WOOD
Assistant General Passenger Agent,	GEORGE W. BOYD
General Manager,	CHARLES E. PUGH
Chief Engineer,	W. H. BROWN
Assistant Chief Engineer,	JOSEPH T. RICHARDS
General Superintendent of Motive Power,	T. N. ELY
General Superintendent of Transportation,	S. M. PREVOST
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Assistant Purchasing Agent,	A. W. SUMNER
Real Estate Agent,	JOHN C. WILSON
Chief Conveyancer,	GEORGE W. I. BALL
General Superintendent P. R. R. Division,	FRANK SHEPPARD
General Superintendent U. R. R. of N. J. Division,	F. WOLCOTT JACKSON
General Superintendent P. & E. R. R. Division,	ROBERT NEILSON
Superintendent Voluntary Relief Department,	J. A. ANDERSON
General Solicitor,	JOHN SCOTT
Assistant General Solicitor,	JAMES A. LOGAN
Secretary Insurance Department,	HUGH B. ELY

CELEBRATION

Of the Sixtieth Anniversary of the First Movement by Steam on a Railway in the State of New Jersey.

Early in November, 1891, a handsomely engraved invitation to attend the ceremonies incident to the completion of the Monument was issued by a committee on behalf of the management of the Pennsylvania Railroad Company.

A fac-simile of the invitation and programme is reproduced on the following pages.

This invitation was accepted by prominent officers of the Pennsylvania and other railroad companies, officials of the Smithsonian Institution, U. S. National Museum, members of the New Jersey Historical Society, Pennsylvania Historical Society, New York Historical Society, American Historical Association, Franklin Institute, American Society of Civil Engineers, Engineers' Club of Philadelphia, the United States District Court of Philadelphia, Faculty of the University of Pennsylvania, Editors of New York, Philadelphia and Washington newspapers, the Local Press and Engineering Journals, and other prominent citizens. The invited guests were carried to Bordentown by special trains from Jersey City and Camden. Many residents of Bordentown and vicinity also participated in the ceremonies. Among them the Mayor and Common Council of the city, who attended in a body, as did the Faculty and Cadets from the Bordentown Military Institute.

Among those present of the "Old Guard" were Joseph Wood, aged 82 years, and John Flynn, Sr., aged 83, both of whom were in the employ of the Camden and Amboy Railroad when the first piece of track was laid in 1831. Isaac Dripps, who first ran the "John Bull" in 1831, expected to be present, but was unable to attend on account of ill health: he was represented by his son. Mrs. Stevens, of Castle Point, Hoboken, New Jersey, widow of Edwin A. Stevens one of the originators and early managers of the road, was present. She was accompanied by Dr. Francis B. Stevens, (who was employed by the C. & A. R. R. in 1832), the oldest male descendent of John Stevens. General John S. Irick, of Vincentown, New Jersey, and Honorable N. S. Rue, of Hightstown,

both of whom were prominent in the Councils of the Camden and Amboy Railroad for many years, were also present.

THE CEREMONIES.

The hour set for the ceremonies having arrived, General William S. Striker, Vice-President of the New Jersey Historical Society, who had been invited by the Committee to preside, called the assemblage to order: after speaking in complimentary terms of the occasion, he introduced Mr. Joseph T. Richards, Assistant Chief Engineer Pennsylvania Railroad Company, who delivered the address of presentation as follows:

TRANSFER OF THE MONUMENT TO THE CUSTODY OF THE UNITED NEW JERSEY RAILROAD AND CANAL COMPANY BY JOSEPH T. RICHARDS, ASSISTANT CHIEF ENGINEER OF THE PENNSYLVANIA RAILROAD COMPANY.

We are assembled here to-day to give history a leaf. It is quite unusual to see active managing railroad men stop in their constructing and operating work and take the time to record or mark in history any of their deeds.

While the deeds of valor of brave warriors, the acts of wisdom of great Statesmen, and the memories of the martyrs and the saints have been for ages perpetuated in carved marble, bronze or upon the painted canvas, few attempts have been made to preserve in a like manner the record of the achievements of the railroad builders or managers — who have aided so materially in the world's progress. It is, in a degree, to do justice to the memories of these, and to recall the acts of the other public-spirited men who initiated the railroad era upon this continent, that we are assembled upon this historic ground to-day.

It is my task to-day simply to place upon record the circumstances that led up to the erection of this milestone in the highway of history, consisting of a simple cube of granite embellished by a bronze tablet bearing an appropriate inscription.

Some years ago the United States Railroad Historian, Mr. J. Elfreth Watkins, of the Smithsonian Institution at

Washington, called our attention to the fact that at this location the first piece of railroad track was laid in the State of New Jersey. In fact it was one of the first pieces of track laid on any part of the vast system of lines now owned, leased and operated by the Pennsylvania Railroad Company. It was laid during the year 1831, and on November 12th of that year, just three-score years ago to-day, the English engine "John Bull" made its first trial trip for the purpose of demonstrating to the satisfaction of the Governor, members of Legislature and other public men of the State of New Jersey that a steam engine would haul cars of passengers and freight on a railroad, as was claimed by the railroad men, and who then asked of the State authorities the right to operate locomotives for this purpose. The Governor, legislators and others, with their good wives, came from Trenton and elsewhere in carriages, and located themselves at the appointed hour along this turnpike and on yonder overhead bridge to witness what many a "doubting Thomas" thought would be a failure; but it was not. Upon this history I will not dwell, as another, a historian, will inform you of these matters more fully. So it simply remains for me to call attention to the duties performed by me in the construction of this monument and the measurement of this section of track. Shortly after Mr. Watkins had called our attention to this historical fact, a few of us were fortunate enough to secure the co-operation of Mr. Isaac Dripps, now alive and in his 82d year, and who is much interested in these ceremonies. He had assisted on the Camden and Amboy Railroad as a mechanic when only 20 years of age. When the "John Bull" arrived he put together the engine as the parts were hauled up from the river landing, a mile away on the water front of Bordentown. He also acted as engineer on the day the engine gave the successful exhibition of which I have just spoken. After a most careful examination of the field Mr. Dripps drove a stake at each end of the section of track, at which points you now see the two monuments. The larger monument needs an explanation, as its manner of construction is a matter of history well worth preserving. The foundation stones are the blocks upon which the rails

were originally laid — cut to form a proper bond for masonry. The rail is from the original track, forty-two pounds per yard in weight, bent to form the circle. The joint-plates are from the original track, as are also the spikes, all of which we have gathered from old shops and material yards for the purpose — the stone blocks placed as supports for the rail are arranged without hammer dressing to show their original shape, and the cube of granite is a fitting milestone in the history of the railway.

I make this statement, so that it may be known with what care and precision our work for this leaf of history has been done.

After the construction now comes the care, and on this sixtieth anniversary of the first movement by steam upon a railway between New York and Philadelphia, I hereby make, in behalf of the Pennsylvania Railroad Company, a formal transfer of this monument to the custody of the United New Jersey Railroad and Canal Company, and accordingly respectfully place the same under the care of Mr. F. Wolcott Jackson, general superintendent of the united Division of which the old Camden and Amboy Railroad now forms a part.

General Striker then introduced Mr. F. Wolcott Jackson, who delivered the address of acceptance.

Acceptance of the Monument by F. Wolcott Jackson, General Superintendent, United Railroads of New Jersey Division, Pennsylvania Railroad.

This monument is erected to record an event of sixty years ago—the introduction of the steam engine as a means of transportation of passengers and freight in the State of New Jersey, and almost the earliest in the United States, by which such transportation could be made regardless of waterways.

The earlier routes of transportation were laid out so as to secure the shortest distance between waterways. The line of which this short line formed a part was to cover the space between the cities of New York and Philadelphia that could not be passed by water. A canal between the rivers Raritan

and Delaware was chartered at the same time. The transportation of freight not requiring quick movement that was forced upon the rail route during the winter months was returned to the natural water routes and via the canal when navigation opened. It was not long before it was seen that for quick transportation of both passengers and freight the water communication must be abandoned as far as possible throughout the whole year, and that only slow freight movements could be continued on the water routes.

It cannot be said that railroads have superseded rivers and canals, or have done away with lake transportation, but they have enabled all parts of our country to be reached, and by far the greater part of the interior States would have remained undeveloped had not the steam engine for transportation been utilized.

The Camden and Amboy Railroad Company and the Delaware and Raritan Canal Company were, at their outset, rivals. Separated they would have crippled each other, and almost immediately after their organization they were united under the name of "The Joint Companies." As early as 1832 it was seen that the waterways, in connection with passenger travel, must give way to an all-rail route, and the New Jersey Railroad and Transportation Company's line was chartered, forming, with the Camden and Amboy Railroad and Branch subsequently chartered, an all-rail line between Jersey City and Camden throughout the entire year, with ferries at either end. The line from Trenton to Philadelphia, known as the Philadelphia and Trenton Railroad, was secured and operated by "The Joint Companies." These lines, from the period of their commencement to this time, have held an advanced position in the internal improvements of the country.

This monument is to commemorate the beginning of that system inaugurated in 1831. It is not improper to mention those who, as directors and officers, and those who, by their counsel and means, originated and developed these works. Their names recall those most active in the affairs of State as well as in internal improvements to whom New Jersey is largely indebted for the advanced position she holds among

the States. We mention the names of Stockton, Stevens, Darcy and Jackson as of those who originated these works; the Potters, Neilson, Parker, Wall, Bayard, Benjamin Fish, Elmer, Green, Buckelew, McKnight, General Cook, Ashbel Welch, John R. Thompson, Corey, Pennington, Nevius, Scott, Acken, Chetwood, Colt, Gregory, are some of those who were among the earliest who, with their money and energies, united in developing what these men devised. These have all passed away. Among the living are Honorable Hamilton Fish, Judge Joseph P. Bradley and William H. Gatzmer, who were connected with the road more than thirty years ago; Isaac Dripps, who ran the first engine in the State of New Jersey, the "John Bull," and on this very spot, is still with us.

This granite monument, the memorial of the commencement of the work that has developed into the magnificent corporation known as the United New Jersey Railroad and Canal Company, is placed here as the act of another corporation, the peer of any other of its kind, whose name is known far and wide as the representative of progress, whose lines are inferior to none other in the world, whose credit stands high, and whose management, from the highest to the humblest, is endeavoring to advance the comfort and welfare of those with whom it comes in contact.

As chief officer of the Pennsylvania Railroad Company, lessee for 999 years, from June 30, 1871, of the works of the United New Jersey Railroad and Canal Company, in New Jersey, in their name, I accept the trust implied by the erection of this monument, and it will be a matter of honorable pride to emulate those who inaugurated and carried on these works as here commemorated.

The history of the origin and growth of these works to this time will be given by Mr. J. Elfreth Watkins, Curator of the Section of Transportation in the Smithsonian Institution, who was formerly an engineer of these lines.

At the conclusion of Mr. Jackson's remarks, the historical address was delivered by Mr. J. Elfreth Watkins, after which the ceremonies terminated, the guests from a distance returning by special trains.

THE CAMDEN AND AMBOY RAILROAD.

Origin, Early History, and Present Position in a Consolidated Railway System.*

By J. ELFRETH WATKINS, C. E.

Curator of the Section of Transportation and Engineering
U. S. National Museum, Washington.

U. S. NATIONAL MUSEUM.

The wheel is a dial by which can be reckoned the degree of progress of every civilization

When a people learn how to make and use it, the crooked ways are made straight—the rough places smooth. Footpaths are replaced by level highways, bridges are built over streams once forded, intercommunication is accelerated, commerce is stimulated, and a rapid national development follows. Such is the sequence of events frequently recorded in the history of the remote past, a history again forcibly repeated in this century of progress, when the construction of the iron highway closely followed the invention and perfection of the steam-driven wheel, the introduction of which in America united North and South and East and West in one grand empire.

From the beginning mankind has been equally dependent upon the road-maker and the wheelwright for safe and rapid movement over land. So we, who are assembled here to-day to view the handsome stone erected by a generous parent to commemorate an important event in the infancy of an adopted child, are glad to pay homage to the memories of Watt, Trevithick, the two Stephensons, and the other mechanical engineers whose genius made it possible, here, to put the iron horse to work on the Camden and Amboy Railway, in the first movement by steam in the State of New Jersey, three-score years ago to-day.

* If there prove to be anything of permanent value in this history, I desire that it be remembered in connection with the memory of the late Colonel Isaac S. Buckelew, under whose guidance many of the facts here recited were collected and compiled, and without whose encouragement these pages would not have been written. The author who pursued this work, during a service extending over fifteen years upon the railroads of New Jersey, controlled and operated by the Pennsylvania Railroad Company, desires also to make acknowledgment of the valuable assistance rendered by the late Benjamin Fish, President of the Freehold and Jamesburgh Agricultural Railroad; Ashbel Welch, President and afterwards Chief Engineer of the United New Jersey Railroad and Canal Company; John G. Stevens, President of the United New Jersey Railroad and Canal Company, and Robert C. Busby, of the Amboy Division, all of whom have passed away. Also for the aid given by Dr. Francis B. Stevens, of Hoboken, N. J.; Isaac Dripps, sometime Master Mechanic of the Camden and Amboy Railroad; Leroy H. Anderson, Secretary of the United New Jersey Railroad and Canal Company; F. Wolcott Jackson, General Superintendent of the United Railroads of New Jersey, Division of the Pennsylvania Railroad, and by Samuel L. Roberts of the Amboy Division. If the facts here narrated shall stimulate historical research or lead the other pioneer railroads of America to follow the example of the great Pennsylvania Railroad and make a similar permanent record of the beginnings of steam transportation on this continent, I shall feel amply repaid for the time consumed in this task.

Nor shall we fail to recall with gratitude the remembrance of the labor of the great civil engineer who designed the original rails — the type now in use in many lands, but first laid upon the ground on which we stand — the beginning of the first iron highway that connected the Metropolis of the Nation with its greatest rival — the Quaker City.

It is a refreshing sign when busy men like yourselves break away from the seductive, bustling activity of the office to indulge, even for a brief period, in retrospection : ceasing to mould the future while you pause to contemplate the past.

While all delight to boast of the rapid strides made during this generation in every branch of industry, it is an indication of human advancement when thinking men find much satisfaction in looking backward : in celebrating the anniversaries of important events, and in otherwise recalling, with grateful appreciation, the good work of the pioneers who removed the first obstacles from the path of progress.

It is eminently fitting, upon this anniversary of an event so important in both State and railway history, that we shall place upon record the circumstances that led to the inception of the Camden and Amboy Railway Company, the historic corporation that, immediately upon its organization, grew so rapidly in extent and importance that it became the greatest power in the State, while its influence was felt everywhere throughout the northern seaboard.

Let us review, briefly, the events that preceded the incorporation of this, the first railway in the State of New Jersey.

Colonial Transportation Routes.

As early as 1675 the Council, whose functions were similar to the present Senate of New Jersey, adopted the first regulations in regard to the location of wagon roads,* and in 1682

* The sparse population of New Jersey at that time is indicated by the following approximate census of the various settlements in the State in 1680:

Province of West Jersey : New Salem, population 60 families ; Burlington, 140. Province of East Jersey : Bergen, 70 ; Newark, 90 ; Elizabeth, 80 ; Shrewbury, 70 ; Perth Amboy, 60.

New York, which was settled in 1609, had, after a growth of 70 years, become the most important seaport in America. Philadelphia was not settled until 73 years after (1682), but so rapid was the growth of that city that it equaled New York in population in 1735, and continued to have the largest population for many years.

(the year Philadelphia was settled) two roads across the State, which afterwards became routes between Philadelphia and New York, were opened according to law.

Sloops then ran from New York to Elizabethtown Point, on Newark Bay, from which point a road had been opened to the Raritan river, near where New Brunswick is now located, where the river was easily forded at low water. This road continued to a point on the Delaware river, a few miles above Trenton, where that river is shallow; there another ford was located. This was called the "upper road." The other or "lower road" branched off from this upper road at a point five or six miles west of the Raritan, sweeping somewhat toward the east and arriving at the shores of the Delaware at the present site of the City of Burlington.

In 1683 the proprietors of West Jersey petitioned Deputy-Governor Laurie to discover "whether there may be a convenient road between Perth town (Perth Amboy) and "Burlington for the entertaining of a land conveyance that "way," and in 1684 a sailing ferry-boat, the first on this route, was put on the river between Perth Amboy and New York, "to entertain travelers," the intention being to cause the public road to pass through Perth Amboy, which subsequently had a large trade with the East Indies and other foreign ports, and which was a rival of New York in obtaining the commerce from New York State and New England, en route to West Jersey and Pennsylvania. But the other road continued to be the popular one.

The First "Monopoly."

In 1707 the Assembly complained to Lord Cornbury "that "patents had been granted to individuals to transport goods "on the road from Amboy to Burlington for a number of "years, to the exclusion of others."

This was denounced as being contrary to the statute respecting monopolies, and "destructive to that freedom which "trade and commerce ought to have."

The Governor took the part of Dellaman, to whom the right of the road was given, and in favoring this "monopoly" in his answer, said: "At present every one is sure, once a fort-

"night, to have an opportunity of sending goods at reason-"able rates, without danger of imposition; and this wagon is "far from being a grievance or monopoly, for *by this means*, "*and no other*, a trade has been carried on between Phila-"delphia, Burlington, Amboy and New York, which was "never known before and which in all probability never "would have been." Thus even at that early day was a cry raised against "Monopoly" by those who were too short-sighted to see in it the door to industrial and commercial development.

Ferries and Stage Routes.

In 1697 the privilege of the ferry at New Brunswick was granted to John Inians and wife, and for many years the present site of that city was called Inians' Ferry.

In 1716 an act was passed "confirming all roads six and four "rods wide as highways."* The rates of ferriage were also established by law, and "Billop's Ferry," from Staten Island to Perth Amboy, and "Redford's Ferry," from Perth to South Amboy, were established soon afterwards.

Route between Philadelphia and New York Established.

In 1751 Joseph Borden put a stage-boat on the Delaware river and advertised that he would "attend at the Crooked-"billet wharf, Philadelphia, every Tuesday, and proceed to "Bordentown on Wednesday." "On Thursday a stage-"wagon, with good awning, kept by Joseph Richardson, will "convey passengers and goods to John Cheek's house, oppo-"site Perth Amboy, and on Friday a well-fitted stage-boat, "kept by Daniel O'Bryant, will proceed to New York." And it was said, "'Tis believed this is thirty or forty hours the "fastest way yet made use of."

Little had been done at that time to improve the common roads. Governor Franklin, in an address to the Assembly in 1768, said: "Even those (roads) which lie between the two "principal trading cities in North America are seldom pass-"able without danger and difficulty."

*All wagon wheels were required to be 4 ft. 8½ inches apart, "turnpike width."

Previous to the Revolution an all-stage route was established from Philadelphia, via Trenton, to Elizabethtown. The stages, called flying machines, carried passengers "through in "two days in summer and three in winter, at three pence per "mile, the length of time consumed being on account of the "miserable roads."

It will be remembered that during a greater part of the Revolution the British army held possession of New York, the Continental army having control of Philadelphia. During these years business of all kinds between these two great cities was practically suspended, the country lying between Philadelphia and New York being a continuous battlefield.

The transportation of cannon and Government stores during this war called public attention to the miserable public roads, and after peace had been declared and business became established upon a firmer basis, the necessity for improvement became still more urgent. From 1785 to 1790, while the seat of the General Government was in New York City, almost all the land travel from the South and West passed through Philadelphia, Bristol, Pa., Trenton, Princeton (then the capital of New Jersey), Elizabethtown, thence by boat to New York, or through Newark to Jersey City, the bridges across the Hackensack and Passaic not being built until 1790–95.

In 1804 the first bridge across the Delaware, at Trenton, was completed. Passengers then left Philadelphia by a tri-weekly line of stages at 4 A. M., arriving in New York at 7 or 8 o'clock the same evening.

A line of sloops conveyed freight at this time from New York to Perth Amboy and thence up the Raritan River to New Brunswick, from which point it was hauled in wagons to South Trenton, where the freight was again transferred to sail-boats and shipped to Philadelphia. Owing to the ice in the river this route was closed during the winter, so that much of the freight at that time of the year en route for Philadelphia was hauled by wagon, via Morrisville and Bristol, or to Camden, via Sand Hills.*

The country did not long remain in a state of peace. During the war of 1812 the bad roads between Trenton and New

* Four miles east of Bordentown.

Brunswick were again a source of much delay in the transportation of Government stores. During this war, "in the "summer of 1814, Fish & Howell, a transporting firm (after- "wards Hills, Fish & Abbey) transported cannon from a "Government vessel at South Trenton to New Brunswick, en "route for New York." *

Early Turnpikes.

The attention of the inhabitants of the interior portions of the State had long been directed to the subject of turnpikes. During the early part of the century nine turnpikes on the route from Philadelphia to New York were chartered.†

Before February 1, 1828, fifty-four turnpike companies had been chartered by the State and 550 miles of turnpikes had been constructed, nearly all with a superstructure of gravel; less than five miles being improved by broken stone.

The turnpike through New Brunswick, Kingston, and Princeton was the favorite stage route for many years. Kingston was a celebrated place in those days, and "With- "ington's Tavern," where the horses were always changed, acquired a great reputation.

Some idea of the volume of the stage business can be gathered from the fact that "forty-nine stages loaded with "passengers have been known to halt here at the same time,

* See Memoir Benjamin Fish, 1880.

† The first turnpike chartered by the State Legislature was the Morris turnpike, March 9, 1801. It extended from Elizabethtown through Morristown and Newton to the Delaware, opposite Milford.

Nov. 30, 1802, the Hackensack and Hoboken turnpike was chartered (Supplement, Nov. 16, 1807).

Nov. 14, 1804, this was followed by the Trenton and New Brunswick (Supplement, Nov. 28, 1806, and Feb. 1, 1814).

Dec. 6, 1804, Jersey City and Hackensack turnpike (Supplement, Nov. 4, 1808).

March 3, 1806, Essex and Middlesex turnpike from New Brunswick to Newark (Supplement, 1821).

Dec. 13, 1807, Princeton and Kingston Branch of Trenton and New Brunswick turnpike.

Nov. 22, 1808, Woodbridge and New Brunswick turnpike through Piscataway to Bordentown, and from Woodbridge to Rahway.

Nov. 24, 1808, Burlington and New Brunswick turnpike (Supplement, Nov. 10, 1809, and Feb. 6, 1811).

Feb. 16, 1816, Bordentown and South Amboy turnpike (Supplement, Jan. 20, 1817, Nov. 6, 1819, and Dec. 8, 1826).

"when more than four hundred harnessed horses * were seen "standing in front of Withington's inn at once."

Kingston was the half-way point between the two great cities, and about it are clustered many remembrances of the old stage days.

John Stevens, the Inventor-Statesman.

In the year 1812 there appeared a remarkable pamphlet, written by a remarkable man, to whose foresight, coupled with the genius of his sons, the State of New Jersey owes much of its greatness. I refer to Colonel John Stevens, of Hoboken, and his sons, Robert, Edwin, and John, the projectors and constructors of the Camden and Amboy Railroad. It has seldom been the lot of any one man, I know of none, to leave behind him such a record of usefulness as we find inscribed beneath the medallion portrait of John Stevens, which hangs in the Section of Transportation and Engineering in the United States National Museum at Washington.

The inscription reads:

"John Stevens, of Hoboken, New Jersey,

"Born in New York, of English lineage, 1749; died in Hoboken, N. J., March 6, 1838. Graduate of King's College (now Columbia) A. M., 1768; admitted to the New York bar 1771; treasurer of New Jersey during the active period of the Revolutionary War; and in the succeeding sixty years resided in New York and on his estate in Hoboken.

"Throughout this long period he labored continuously for the introduction and application of steam to navigation and to railroad locomotion.

"It was on his petition that the patent law of 10th April, 1790 — the foundation of the American patent law — was framed (see Journal of House of Representatives, p. 30).

"In 1792 he took out patents for propelling vessels by steam-pumps, modified from the original steam-pumps of

* Gorden's Gazette of N. J., 1834, p. 165.

Savary. He made many experiments on different modes of propulsion by steam, having as his associates the elder Brunel, constructor of the Thames Tunnel, Chancellor Robert L. Livingston, his brother-in-law, and Nicholas J. Roosevelt. In 1798 he constructed a steamboat that navigated the Hudson.

"He made the first practical application of steam to the screw-propeller in 1804; and although the screw-propeller did not come into use until thirty-five years afterwards his engine and screw, which are still preserved, show the correctness of his ideas, as well as the imperfection of the workmanship of that period that prevented commercial success. His short four-bladed screw has survived many forms afterwards tried.

"He patented the multi-tubular boiler in the United States, 1803; in England, 1805; established the first steam ferry in the world, between New York and Hoboken, October 11, 1811, with the 'Juliana.'

"In 1812 (five years before the beginning of the Erie Canal) he addressed a memoir to the New York State Commission, urging the immediate construction of a railroad instead of a canal. This memoir, with the adverse report of the Commissioners (De Witt Clinton, Gouverneur Morris, and Chancellor Livingston), was published at the time, and again with a preface by Charles King, President of Columbia College in 1852. At the date of this memoir, although railroads for carrying coal had been in use in England for upwards of two hundred years, there was not a steam locomotive or passenger car in use in the world. His plans and estimates were definite, and after the introduction of railroads their accuracy was proven.

"In 1815 he received a charter from the State of New Jersey for a railroad to connect New York and Philadelphia — the first railroad charter granted in America; and in 1823, in conjunction with Horace Binney and Stephen Girard, obtained from the State of Pennsylvania a charter for a railroad from Philadelphia to Lancaster, on the line of the present Pennsylvania Railroad.

"In 1826, in the seventy-eighth year of his age, to give an ocular demonstration, he built the first locomotive that ran on a railroad in America. It had a multi-tubular boiler, and carried half a dozen people at a speed of over twelve miles an hour.

"'Born to affluence, his whole life was devoted to experiments, at his own cost, for the common good. He was a thoroughly excited and unwearied experimentor in the application of steam to locomotion on the water, and subsequently on the land. Time has vindicated his claim to the character of a far-seeing, accurate, and skillful practical experimentalist and inventor. The thinker was ahead of his age.'

"CHARLES KING, *President of Columbia College, 1852.*"

Truly a wonderful record of the life work of one man. The pamphlet of 1812 (printed by T. & J. Swords, New York), "Documents Tending to Prove the Superior Advan-"tages of Railways and Steam Carriages Over Canal Naviga-"tion," entitles him, even if he had failed, as he did not, in the field of invention, to be held in grateful remembrance by his countrymen for his broad and statesmanlike views, keen perception, ardent patriotism, and a demonstration that was prophetic in its accuracy.

THE UNION LINE.

At that time (1812), in connection with his son, Robert, he had made steamboat * navigation on the Delaware a commercial success. Shortly afterward he became connected with the firm that was soon merged into the famous Union Line, which controlled the transportation of merchandise and passengers between Philadelphia and New York for many years. During that time the through route, one hundred and one miles long, between Philadelphia and New York, was divided into three links:

*The machinery of the steamboat "Phœnix," the first steam-driven craft to venture out to sea, which was launched a few days after Fulton's "Clermont," was designed by John Stevens and built by Robert L. Stevens, who accompanied the boat on the first ocean voyage by steam, from Sandy Hook to Cape May, 1808.

(1) The steamboat route from Philadelphia to Trenton, ...	36 miles.
(2) Overland stage and wagon route, Trenton to New Brunswick, over the turnpike, :	25 "
(3) Steamboat route, New Brunswick to New York, ...	40 "
	101 miles.

The Trenton and New Brunswick Turnpike Company (chartered in 1804) had made a marked improvement in their road, but these twenty-five miles were a tedious journey to passengers, and expensive to the company in hauling freight by wagon.

The First Railroad Charter.

Colonel Stevens was anxious to put his recommendations of 1812 into practice. In 1817 he obtained a charter from the State of New Jersey "to build a railroad from the River Delaware, "near Trenton, to the River Raritan, near New Brunswick." This was undoubtedly the earliest railroad charter granted in America; but no tangible result followed, because the scheme was regarded as wild and visionary. The introduction of the steamboat, coupled with the success of the Duke of Bridgewater in the introduction of canals abroad, had made them more popular with capitalists than the untried railroad, and no money could be raised for that undertaking. Colonel Stevens regretted that his financial condition was not such as to warrant him in building the road at his own expense.

First Charter of the Pennsylvania Railroad.

His interest in the subject of internal communication did not flag on account of this failure, for in 1823, through the exertion of Mr. Stevens, acts were passed by the Legislature of Pennsylvania for the incorporation of a company to construct a railway from Harrisburg to Pittsburgh, and another company to construct a railway from Philadelphia to Columbia, in Lancaster county, among the incorporators being John Stevens, Stephen Girard and Horace Binney.

John Stevens's Experimental Locomotive.

Three years later (1826) Colonel Stevens, then seventy-six years old, constructed, at his own expense, a locomotive with a multi-tubular boiler, which he operated for several years on a circular track on his estate at Hoboken. A model of this locomotive, together with the original multi-tubular boiler which formed a part of it, is also preserved in our National Museum.

English Railways in 1825.

Shortly after this the projectors of railroads on this side of the Atlantic became fully acquainted with what had been done in England. In 1825 the Pennsylvania Society for Internal Improvement, with which Mr. Stevens was in close accord, published an elaborate and handsomely-illustrated report showing what had been accomplished by the English engineers. This report was prepared after a personal examination of the English railways by William Strickland, a member of that society, who had been sent abroad for the purpose of investigation.

The facts therein stated, connected with a reasonable success on the Stockton and Darlington Railroad (opened in 1825), strengthened the hopes of those who believed in the ultimate success of the railroad and locomotive in America.

Need of a Railway Recognized.

While the rivers were open to navigation the Union Line carried passengers and freight by steamboat from New York to New Brunswick; thence by wagon or stage-coach to South Trenton, and thence by Union Line steamboats to Philadelphia. Passengers then left New York at 12 o'clock, noon, and arrived in Philadelphia early next morning.* This was the condition of affairs at the close of the year 1827.

Throughout the State, which lay between the prosperous steamboat lines operated on the Delaware and Raritan, progressive citizens were eagerly watching the railway experi-

* This was done for many years, and until the Camden and Amboy Company was organized. The charges were from 75c. to $1.25 per 100 lbs.

ments abroad, and earnestly hoping for a success that might warrant the importation of the iron horse into America.

First Public Railroad Meeting.

On the 14th of January, 1828, the first meeting * of citizens

* The following is a true copy of the minutes of the meeting:

At a large and respectable meeting of the citizens of the State of New Jersey, friendly to the proposed railway from Camden to Amboy, convened at the Court-House in Mount Holly on the 14th of January, 28, pursuant to notice, John Black was appointed president, John Dobbins, vice-president, and Charles Stokes and James Newbold were appointed secretaries.

The object of the meeting having been stated to be for the purpose of promoting the above enterprise and adopting suitable measures to insure its success, William Cox, John Beatty, George Haywood, Chalkley Atkinson, Strange N. Palmer, Anthony Sharp and Jeremiah H. Sloan were appointed a committee to draft resolutions expressive of the sense of this meeting on the subject.

The committee reported the following resolutions, which were unanimously adopted:

Resolved, That, deeply impressed with the importance of internal communication, this meeting conceive that sound policy requires that they should be extended throughout our Atlantic States.

Resolved, That, situated as New Jersey is, between the two great emporiums of the Union, and with great resources of her own to sustain the undertaking, it is a reproach to the enterprise of her citizens that a line of internal intercourse has not been extended across her territory.

Resolved, That the application to the Legislature for a railway from Camden to Amboy is highly approved by this meeting, and is entitled to their most favorable consideration, whether it be considered with reference to the local interests of our own State or as one of the most important links in the great chain of internal intercourse.

Resolved, That this meeting most earnestly recommend to the Legislature the passage of an act incorporating a company with a liberal charter for the construction of a railway from Camden to Amboy.

Resolved, That a committee of four persons be appointed to represent the wishes of this meeting to the Legislature, and to take such steps as they shall deem expedient to bring the subject fully and fairly before them.

Whereupon Samuel J. Read, Abraham Brown, Isaac Wilkins and Jeremiah H. Sloan, Esqs., were unanimously appointed to constitute said committee.

It was then, on motion,

Resolved, That this meeting do approve the memorial now read, addressed to the Legislature, praying the incorporation of a company for the construction of said railway, and recommend the circulation thereof for signature.

Resolved, That John Clement, Benjamin B. Cooper, Samuel Haines, Samuel Ellis and Samuel Lanning, of the County of Gloucester; John Beatty, Clayton Newbold, Anthony S. Earle, Chalkley Atkinson and Joel Hollinshead, of the County of Burlington, be appointed to circulate the said memorial for signatures, and also to appoint such persons in the adjoining counties as they shall deem proper to circulate the same.

Resolved, That the thanks of this meeting be given to the president, vice-president and secretaries, and the proceedings thereof be signed by them and published.

Signed by the officers and published in the *New Jersey Mirror*, January 16, 1828.

interested in the construction of a railroad from Camden to South Amboy was held at the Old Court-House at Mount Holly, the county seat of Burlington county.

During 1828 and 1829 meetings were held at Burlington, Bordentown, Princeton, Trenton and other portions of the State in favor of this movement. Numerous petitions and memorials were presented to the Legislature of 1828–29 and 1829–30 praying for the incorporation of a railroad company.

On the 4th day of July, 1828, the corner-stone of the Baltimore and Ohio Railroad was laid at Baltimore, with imposing ceremonies, by the venerable Charles Carroll of Carrollton, the only surviving signer of the Declaration of Independence. At that time two or three short tramways had been laid in the United States from quarries or collieries to adjacent navigable streams: In Delaware county, Pennsylvania, near Leipers to the Delaware river; in Virginia on the James; in Massachusetts near the Neponset; and in Pennsylvania at Mauch Chunk. The Delaware and Hudson Canal Company was then building a railroad from Carbondale to Honesdale, and railroads were projected from Albany to Schenectady in New York, and from Charleston towards Hamburg in South Carolina.

Early in 1829 the Stourbridge Lion,* the first locomotive that ever turned a driving wheel on a railroad built for traffic on the Western Continent, was ordered from England by the Delaware and Hudson Canal Company, arriving here in August, when it made its first trip under Horatio Allen. Later in that year great impetus was given to the construction of railways by Stephenson's success in England with the "Rocket" on the Manchester and Liverpool road.

Advocates of the Canal Oppose the Railroad.

But there were many who did not believe that a steam railroad could be made to pay in New Jersey. The success of the steamboat routes on both sides of the State, they believed had demonstrated that water-communication was what was needed. Petitions, many and long, were presented to the Legislature

*The original boiler, wheels and a cylinder of this locomotive are preserved in the National Museum at Washington.

of 1828–29 for a canal to connect the Delaware with the Raritan — many of the petitioners desiring that the canal, like the Erie in New York, should be constructed by the State and owned by it.

The owners of the Union Line at an early day espoused the cause of the railroad as against the canal, naturally fearing a loss of business if any rival corporation should build a canal across the State. The Union Line had been uniformly successful in their rivalry with the People's Line and other competitors for the business between New York and Philadelphia. They had thus made many enemies who, as soon as the canal was talked of, gave their allegiance to the new scheme.

When the Legislature of 1829–30 assembled, they found themselves confronted by two influential lobbies, one clamoring for a charter for a canal and another for a railroad. Some idea of the amount of ill-feeling existing at that time may be gathered from the fact that during that winter the prominent friends of both companies thought it necessary to go armed about the streets of Trenton at night — this was the beginning of the active railroad legislation in New Jersey.

A Compromise Effected.

Upon the reassembling of the Legislature, after the Christmas recess, in January, 1830, the friends of each measure found that both would be defeated unless some conciliatory action was taken. At last a compromise was effected, the details of which were agreed upon by Robert L. Stevens and John C. Stevens, who met Commodore Robert F. Stockton in the lobby of the Park Theatre, New York, between the acts of a play, in the latter part of January, 1830. As the result of the conference one charter was granted to the Camden and Amboy Railroad and Transportation Company, and another charter to the Delaware and Raritan Canal Company on the same day, the 4th of February, 1830.

Provisions of the Charter.

The capital stock authorized was $1,000,000, divided into shares of $100 each, with the privilege of increasing it to

$1,500,000, "to be employed in the construction of a railroad "or roads, with all the necessary appendages, at some point "between Cooper's and Newton's creeks in the county of "Gloucester, to some point on the Raritan Bay * * * with a "lateral road to Bordentown * * * reserving to the Legisla- "ture the right to subscribe to one-fourth the stock * * * "and pay a transit duty of ten cents for each passenger and "fifteen cents for each ton of merchandise in lieu of all other "taxes." The State reserved the right to purchase the road at the expiration of thirty years at a valuation to be made by law. The act contained the further provision "if the Legis- "lature shall authorize the construction of any other road to "transport passengers from Philadelphia to New York to "terminate within three miles of the commencement or ter- "minus of this road the all transit duties shall cease." *

Organization: First Officers.

The meeting of the stockholders at which the first organization of the Camden and Amboy Railroad was effected was held at the house of Isaiah Toy, northeast corner Front and Federal streets, Camden, N. J., April 28, 1830. The following persons were chosen the first officers and directors of the company: Robert L. Stevens, of Hoboken, President; Edwin A. Stevens, of Hoboken, Treasurer; Jeremiah H. Sloan, of Camden, Secretary. The above named, together with Abraham Brown, of Mount Holly; William McKnight, of Bordentown; William I. Watson, of Philadelphia; Benjamin Fish, of Trenton, N. J., were chosen Directors. Robert L. Stevens was also appointed Chief Engineer.

Early Railroad Surveys.

The early surveys† of the Camden and Amboy Railroad

*This act was amended in Feb., '31, and in March, '32, making the protection more absolute. The Act of March 15, '32, stated "That it "shall not be lawful at any time during the charter to construct any "other railroad in the State without the consent of the companies, which "shall be intended or used for the transportation of passengers or mer- "chandise between the cities of New York and Philadelphia."

†The following are *verbatim* extracts from Major Wilson's report of October 11, 1830, to the Board of Directors of the Camden and Amboy Railroad Company:

Company were made under the direction of Major John Wilson, a graduate of West Point Military Academy, and were begun in the spring of 1830 and completed on October 2, in that year, being hastened by the course taken by the canal company, who also made surveys for a railroad along the canal bank. Lieutenant William Cook and John Edgar Thomson, afterwards president of the Pennsylvania Railroad, had direct charge of the surveying parties, the former having charge of the section from South Amboy to (Crosswicks Creek, near) Bordentown, and the other from that point to Camden. The surveys were made so that as large a proportion of the distance between New York and Philadelphia as possible would be a water route, it being the belief in those days that traveling by steamboat would always be more popular and more economical than traveling overland, and that railroads would only be subsidiary to the water routes. And this idea was adhered to for years, for even after the railroad was opened from Camden to Bordentown, the steamboats remained on the river to carry passengers and freight between these points.

The books of the company show that the first charge made to grading was for work done at Bordentown on December 4, 1830, the amount expended for grading during 1831 being $100,898.39. The first horse bought was purchased June 20, 1831. The first bill of lumber was paid to Benjamin Fish July 26, 1831, and Robert L. Stevens, first president of the company, drew his first year's salary, $6,000, November 26, 1831.

Grades: "Assuming the velocity of a locomotive engine on an inclination of 30 feet per mile at 10 miles per hour, the comparative velocity in traveling with the same weight on an inclination of 35 feet per mile will be as the difference between the space of $\frac{1666}{10000}$ and $\frac{1536}{10000}$ of a mile per minute passed over. While, therefore, the engine has passed over 1 mile on an inclination of 30 feet, it would have traveled 1 mile, 6 chains and 72 links on an inclination of 30 feet; and in case of 40 feet graduation the difference would be 13 chains, 45 links." Of curves he says: "As carriages are kept on the rails by flanges on the wheels, it is obvious that where there is on any portion of the line an excess of curvation, the friction from the rubbing on the sides of the rails, and consequent retardation, must be very great." Several routes as laid down on the map were surveyed before he determined upon the one which was adopted. The estimate for grading 61⅓ miles of road was $276,212.

Inception of the Delaware and Raritan Canal.

The construction of a canal between the Delaware and Raritan rivers had been under contemplation for many years.

The first act of legislation relating thereto will be found in the charter granted in the year 1804 to William Patterson and others. "for the purpose of opening a communication by "water from the river Raritan at or near New Brunswick to "the tidewater of the river Delaware at or near Lamberton." But the importance and necessity of a canal across New Jersey had been made more apparent by the difficulties which attended the transportation of military stores and other property during the war of 1812, and a route was surveyed in the year of 1816, under the auspices of Thomas P. Johnson, Esq., of Princeton, from the Delaware to the Raritan, by the way of the Heathcote and Lawrence brooks.

In the year of 1823 George Holcombe (who was also one of the Commissioners in 1816), L. Q. C. Elmer and Peter Kean were appointed commissioners by the State of New Jersey "for the purpose of ascertaining the practicability of the canal "to unite the waters of the Delaware and Raritan rivers, "* * * and to report to the Legislature the probable "expense, and revenue to be derived therefrom."

These Commissioners recommended that the State should undertake the work and pointed out the mode by which the means were to be raised. Their recommendations were referred to a committee of the Legislature who made a full report in favor of their approval, "if the benefit expected may be "realized to the State without assuming the great responsi- "bility which must be incurred by its undertaking the "expense and future risk of the canal and its management as "a State property, and advocating the incorporation of a "private company, by a charter that will secure to the State "by subscriptions to the stock or other means a reasonable "part and interest in the profits, and direction of the said "company."

The Act of Incorporation of 1826.

The committee also reported a bill incorporating this idea, which was passed by the Legislature, by a vote of thirty-one to eleven in the Assembly and nine to four in the Council, on the 30th of December, 1826. By this act of incorporation, authority was granted to a company to construct a canal from the Delaware to the Raritan river.

The act contained a provision * of the most effective protection against canal and railroad competition, and corresponded in this respect with the protection of ten miles secured to the Morris Canal against any rival works.

These were among the first acts passed by the State of New Jersey in reference to canal and railways in which the principle of protection, or as it was afterwards termed "monopoly," was incorporated. But this practice in regard to bridges and other public works was old.

State Aid Refused.

As the people before whom the subject was discussed, and by whom it was thoroughly understood, had decided, through their representatives in the Legislature, that the internal improvements of New Jersey, if made at all, were to be made by private corporators, no capitalist, without protection, could be induced to risk his money in such stupendous works without any definite prospect of remuneration. For that reason these special privileges were offered.

The State having refused even to assist in building the canal, an attempt was made to raise the funds by private subscription. It is related that this was accomplished in this way: John Potter, a Scotch-Irishman, who came to this country in 1818 and settled in Charleston, S. C., had acquired considerable wealth through his speculations there Robert

* By the seventeenth section, it was provided that "it should not be "lawful for any person or persons, body politic or corporate whatever, "to construct any canal or railway within ten miles of any point of the "said canal or feeder without the consent of the said company," and "that it shall be the duty of the Chancellor of the State, upon applica- "tion made therefor by bill in due form of law by the said Company, "to issue his injunction to stay and prevent the erection and construc- "tion of any such canal and railway."

F. Stockton, an officer of the United States Navy (afterwards commodore), from Princeton, N. J., having been detailed to make a survey of the southern waters in 1823, met and married Maria Potter, daughter of the above-named gentleman, and located, with his family, in Princeton in 1826. As the canal was expected to pass through Princeton, he was naturally interested in the project and became identified with its projectors at an early day. When the funds for its construction were not forthcoming he induced his father-in-law, John Potter, who had over half a million dollars in the United States Bank, to withdraw his funds from that institution to insure the construction of the canal. This Mr. Potter subsequently did, and it resulted fortunately for him, as the United States Bank collapsed a short time afterwards.

Terms of the Canal Charter.

By the charter of the Delaware and Raritan Canal, passed February 4, 1830, the capital authorized was $1,000,000, with the privilege of increasing it to $1,500,000, divided into shares of $100 each.

The canal was to be fifty feet wide at water-line, five feet deep, and the feeder thirty feet wide and four feet deep.

The canal company was authorized to charge five cents per ton per mile, and no other canal was to be built within five miles of any point on the canal or feeder. According to the charter the State was to receive a transit duty of eight cents on each passenger and eight cents on each ton of freight transported through the canal (except coal, lumber, ashes and such low-priced articles, which were to pay only two cents per ton), and the State had the right to purchase the canal at a fair appraisement thirty years after its completion.

On February 3, 1831, this time was extended to fifty years, in consideration of the fact that the canal should be made seventy-five feet wide, seven feet deep and the locks one hundred feet long and twenty-four feet wide, and after the passage of the Marriage act (February 15, 1831), it enjoyed, of course, the same privileges of protection as the Camden and Amboy Railroad Company.

The commissioners appointed by the State to attend to the subscription of stock in the canal company met at Mount Holly, February 17, 1830—James Parker, James Neilson, John Potter, William Halstead and Garrett D. Wall being present. They decided to open the subscription books as follows :

Mar. 23, 1830, at the house of William Herbert, Trenton.
" 24, 1830, " " " " John Joline, Princeton.
" 25, 1830, " " " " George Follett, New Brunswick.

This arrangement was carried out, and John Potter became the largest stockholder.

Organization and First Officers.

The first meeting of stockholders was held at the house of William Herbert, in Trenton, on the 10th day of May, 1830, who organized by the selection of directors and officers, as follows :

Robert F. Stockton, of Princeton, president; John R. Thomson, of Princeton, secretary; James Neilson, of New Brunswick, treasurer; the remaining directors being James Parker, of Perth Amboy; William Halstead, of Trenton; Garrett D. Wall, of Burlington; Joseph McIlvaine, of Burlington; James S. Green, of Princeton.

The work was commenced at once, Canvass White, who had acquired distinction by his connection with the Erie Canal, being the chief engineer, assisted by J. Humstead, Ashbel Welch and Edwin Douglas.*

The summer of 1830 was occupied in making the surveys.

Railway Surveys Made by the Canal Engineers.

The desire of the canal company to construct a railroad was so great, that surveys for a railroad over the same route were made at the same time. At the meeting of the board of directors, October 1, 1830, a resolution was adopted to the effect that it was "expedient to build a direct railroad from the "Raritan to the mouth of the Heathcote brook, thence along

* Inventor of the inclined canal plane.

"the canal lines to the Delaware river at Tullytown, *provided* "the necessary powers and privileges can be obtained."

October 25, 1830, the board met to receive the report of Canvass White which, after alluding to the advantages of the proposed route for the canal, states: "Although the country "appeared unfavorable for a canal, it is very favorable for a "railroad from near Kingston to the Raritan — surveys were "made and a line located which can in a few days be prepared "for grading."

U. S. NATIONAL MUSEUM.

Estimates of Cost of Canal.

Mr. White's estimates were as follows:

Navigable feeder, ...	$305,168
Main canal, ...	738,937
Damages, &c., ...	68,400
Add for contingency, ...	55,625
	$1,168,130

Thirty-eight and a half miles:

Estimated cost of railroad, per mile, $6140 =	$221,040
Add for contingency, 5 per cent., . . .	11,052
	$232,092
To which must be added the cost of crossing the Delaware, estimated at* . .	$35,000

At the same meeting a committee, consisting of Robert F. Stockton, James Neilson, William Halstead, James Parker and Garrett D. Wall, were appointed to present a memorial to the Legislature at the next meeting, asking for railroad privileges and the extension of the time when the State shall be authorized to purchase the canal from thirty to sixty years.

The Marriage Act.

After the charters were granted, both to the canal and railroad, it was found that the necessary amount of capital to con-

*The estimate for grading the 61⅓ miles of railroad from Camden to South Amboy was $276,212.01.

struct the canal could not be raised as rapidly as was expected, since capitalists refused to invest their money in canal shares in view of the fact that a railroad was being built to connect Philadelphia and New York.

The projectors of the canal were greatly alarmed. It looked as if John Stevens's recommendations of 1812 would be followed, and that the canal would not be built, owing to a lack of funds. Early in the session of 1830–1831, Commodore Stockton, and others of the committee appointed October 25, 1830, applied to the Legislature for the right to construct the railroad on the canal bank. A short portion of track had already been laid. The managers of each company saw that the carrying out of such a course would be fatal to the stockholders, both of the canal and the railroad, and a compromise was effected, and what was called "The Marriage Act" was passed February 15, 1831.

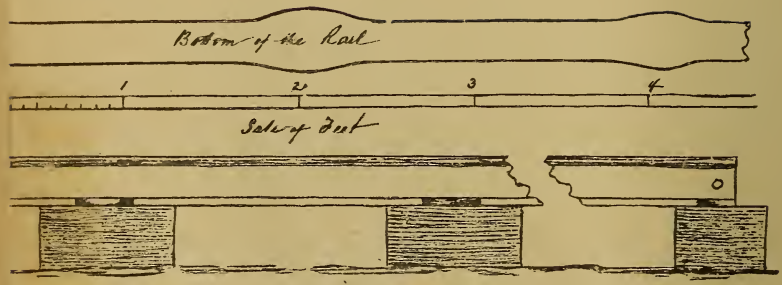
The act also provided that "the canal and railroad should "be completed within the time specified in their respective "charters, and if one of the works at the expiration of such "time be completed without the other, then the work com-"pleted shall be forfeited to the State."

The companies united by this act combined their stock at the same valuation, but elected separate officers and directors and kept their accounts entirely separate and distinct. The boards elected a joint president and secretary to preside over the meetings of the joint boards.

No other agreement of a character similar to this has been made, so far as is known, in this or any country.

Thus the famous "Joint Companies" came into existence.

ry two feet
the by 4 inches.



Liverpool November 26 1830.

he will you contract to deliver at Liverpool, say from five
) of the best quality Iron rolled to the above pattern in
to lap as shewn in the drawing, with one hole at each
the lower flange at every two feet. Cash on delivery
he first delivery, and at what rate pr month until the
l the terms just as the work give satisfactory a more
ows, as this is but about one sixth part of the quantity
your answer (as soon as convenient) to the care of
of the United States at Liverpool

I am

Your obedient Servant

Robt L Stevens

President & Engineer of the Camden & South
Amboy Rail Road & transportation Company

THE STEVENS RAIL AND SPIKE.

Early in October, 1830, and shortly after the surveys of the Camden and Amboy Railroad were completed, Robert L. Stevens (born 1787) sailed for England, with instructions to order a locomotive and rails for that road.

At that time no rolling mill in America was able to take a contract for rolling T rails.

Robert Stevens advocated the use of an all-iron rail in preference to the wooden rail or stone stringer plated with strap iron, then in use on one or two short American railroads. At his suggestion, at the last meeting held before he sailed, after due discussion, the board of directors of the Camden and Amboy Railroad passed a special resolution authorizing him to obtain the rails he advocated.

Robert L. Stevens Invents the American Rail and Spike.

During the voyage to Liverpool he whiled away the hours on shipboard by whittling thin wood into shapes of imaginary cross-sections until he finally decided which one was best suited to the needs of the new road.

He was familiar with the Berkenshaw rail, with which the best English roads were then being laid, but he saw that, as it required an expensive chair to hold it in place, it was not adapted to our country, where metal workers were scarce and iron was dear. He added the base to the T rail, dispensing with the chair. He also designed the "hook-headed" spike (which is substantially the railroad spike of to-day) and the "iron tongue" (which has been developed into the fish-bar), and the rivets (which have been replaced by the bolt and nut) to complete the joint.

A fac-simile of the letter,* which he addressed to the English

* This letter reads :

Liverpool, *November 26th, 1830.*

"Gentlemen,—At what rate will you contract to deliver at Liverpool, say from 500 to 600 tons of railway, of the best quality of iron rolled to the above pattern in 12 or 16 feet lengths, to lap as shown in

iron masters a short time after his arrival in London, is preserved in the U. S. National Museum. It contains a cross-section, side elevation and ground plan of the rail, for which he requested bids. (See plate.)

The base of the rail which he first proposed was to be wider where it was to be attached to the supports than in the intervening spaces. This was afterwards modified, so that the base was made the same width (three inches) throughout.

Difficulty of Rolling the American Rail.

Mr. Stevens received no favorable answer to his proposals, but being acquainted with Mr. Guest (afterwards Sir John Guest) a member of Parliament, proprietor of large iron works in Dowlais, Wales, he prevailed upon him to have rails rolled at his works. Mr. Guest became interested in the matter and accompanied Mr. Stevens to Wales, where the latter gave his personal supervision to the construction of the rolls. After the rolls were completed the Messrs. Guest hesitated to have them used, through fear of damage to the mill machinery, upon hearing which Mr. Stevens deposited a handsome sum guaranteeing the expense of repairing the mill in case it was damaged. The receipt for this deposit was preserved for many years among the archives of the Camden and Amboy Company. As a matter of fact, the rolling apparatus did break down several times. "At first," as Mr. Stevens in a letter to his father, which I have seen, described it, "the rails came from the rolls twisted and as crooked as snakes," and he was greatly discouraged. At last, however, the mill men acquired the art of straightening the rail while it cooled.

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the drawing, with one hole at each end, and the projections on the lower flange at every two feet, cash on delivery?

"How soon could you make the first delivery, and at what rate per month until the whole is complete? Should the terms suit and the work give satisfaction a more extended order is likely to follow, as this is but about one-sixth part of the quantity required. Please to address your answer (as soon as convenient) to the care of Francis B. Ogden, Consul of the United States at Liverpool.

I am

Your obedient servant,

Robert L. Stevens,

President and Engineer of the Camden and South Amboy Railroad and Transportation Company."

The first shipment,* consisting of five hundred and fifty bars eighteen feet long, thirty-six pounds to the yard, arrived in Philadelphia on the ship Charlemange May 16, 1831.

Over thirty miles of this rail was laid before the summer of 1832.

A few years after, on much of the Stevens rail laid on the Camden and Amboy Railroad, the rivets at the joints were discarded, and the bolt with the screw-thread and nut, similar to that now used, was adopted as the standard.

The rail was first designed to weigh thirty-six pounds per yard, but it was almost immediately increased in weight to between forty and forty-two pounds, and rolled in lengths of sixteen feet. It was then three and a-half inches high, two and one-eighth inches wide on the head and three and a-half inches wide at the base, the price paid in England being £8 per ton. The import duty was $1.85.

The first shipment of rail, having arrived in America, was transported to Bordentown, and here, upon the ground on

* A list of the vessels chartered to transport the rails, with dates, tonnage, &c., is given below ;

Date.	*Ship.*	*No. of Bars.*	*Tonnage.* tons.	cwt.	lbs.	*Rate of Duty.*
May 16, 1831.	Charlemagne,	550	504	0	14	$1.85
May 19, 1831.	Salem,	963	774	2	14	1.85
April 7, 1832.	Caledonia,	38	73	3	07	1.85
April 23, 1832.	Armadilla,	525	1,000	3	21	1.85
May 4, 1832.	George Clinton,	624	986	2	14	1.85
June 2–18, 1832.	Henry Kneeland,	204	377	3	21	1.85
May 8, 1832.	Cumberland,	1,464	2,790	1	00	1.85
June 2, 1832.	Gardiner,	601	1,136	0	00	1.85
June 5, 1832.	Globe,	499	943	1	14	1.85
June 6, 1832.	Jubilee,	70	130	0	21	1.85
July 18, 1832.	Hellen,	1,080	2,004	3	21	1.85
July 19, 1832.	Nimrod,	937	1,745	3	00	1.85
Aug. 2, 1832.	Emery,	240	454	2	00	1.85
Aug. 6, 1833.	Ajax,	364	700	0	21	1.85
Aug. 13, 1832.	Concordia,	622	1,174	3	14	1.85
Aug. 14, 1830.	William Byrny,	1,120	2,138	1	07	1.85
Aug. 20, 1832.	Mary Howland,	932	1,755	3	07	1.85
Aug. 23, 1832.	Pulaski,	488	924	1	00	1.85
Aug. 24, 1832.	Robert Morris,	1,985	3,732	0	14	1.85
Aug. 27, 1832.	Ann,	506	961	2	07	1.85
Sept. 3, 1832.	Montgomery,	1,369	2,959	0	14	1.85
Sept. 4, 1832.	Marengo,	534	1,004	2	07	1.85
Oct. 12, 1832.	Vestal,	237	460	2	07	1.85

This iron proved to be of such superior quality, that after it was worn out in the track the company's mechanics preferred it to new iron in making repairs. Some of this rail is still in use in side tracks. It is pronounced equal in durability to much of the steel rail of to-day.

which we stand, and which this monument is erected to mark forever, was laid the first piece of track (about five-sixths of a mile long) in August, 1831. The Camden and Amboy Company, following the example of the Manchester and Liverpool Railroad, laid their first track upon stone blocks two feet square and ten to thirteen inches deep. These blocks were purchased from the prison authorities at Sing Sing, N. Y. Some of these stone blocks have been used in constructing the foundation for this monument.

First Joint Fixtures.

Mr. Stevens ordered the first joint fixtures, also from an English mill, at the same time. The ends of the rails were designed to rest upon wrought-iron plates or flat-cast plates. The rails were connected at the stems by an iron "tongue" five inches long, two inches wide and five-eighths of an inch thick. A rivet, put on hot, passing through the stem of each rail near the ends of the bar, fastened it to the tongue and completed the joint. A hole oblong in shape, to allow for expunctral contraction, was punched in the stem at each end of the rail.

The First Railroad Spikes.

The first "spikes six inches long, with hooked heads," were also ordered at the same time. These were undoubtedly the "first railroad spikes" (as they are known to the trade) ever manufactured.

Mr. Stevens neglected to obtain a patent for these inventions, although urged to do so by Mr. Ogden, American Consul at Liverpool, and the credit of being the inventor of the American Rail was for a time claimed for others, but the evidence brought forward in late years fully established the fact that he was the originator of the American system of railway construction.

The "Stevens rail and spike" gradually found great favor everywhere in America—all the roads being relaid with it as the original T or strap rail became worn out.

In England the T rail still continues to be used. The London and Birmingham Railway, opened in 1838, was laid

with Birkenshaw rails; part with the straight and part with the fish-bellied rail and the remainder with reversible "bull-headed" rail, both types being supported by chairs.*

Sixty years have elapsed since this rail was adopted by the Camden and Amboy Company, and with the exception of slight alterations in the proportions incident to increased weight, no radical change has been made in the "Stevens rail," which is now in use on every railroad in America. Many improvements have been made in the joint fixture but the "tongue" or fish plate improved into the angle splice bar is in general use, and nothing has yet been found to take the place of the "hook-headed" railroad spike which Robert Stevens then designed.

The track upon which we stand was the first in the world that was laid with the rail and spike now in general use.

Mr. Stevens Examines English Locomotives.

Mr. Stevens divided his time while abroad between arranging for the manufacture of track material and examining the English locomotives that were being constructed or had been in service.

A year had elapsed since the opening of the Liverpool and Manchester Railway, and the English mechanics had not been idle. The "Rocket," although successful in the Rainhill contest, when put to work had shown many defects that Stephenson & Co. were striving to correct in subsequent locomotives.

The "Planet," built by that firm, was first tried in public December 4, 1830, shortly after Mr. Stevens arrived in England, and at that time was undoubtedly the best locomotive in the world.

The "John Bull" Ordered.

Mr. Stevens was present at a trial when the "Planet" showed most satisfactory properties, and he at once ordered a locomotive of similar construction, from the same manufacturers

* The experiment of laying the Stevens rail in chairs was tried on the Albany and Schenectady road in 1837, on the Hudson River Railroad, 1848, but the chairs were soon afterwards discarded, nothing but spikes being used to attach the rail to the tie.

for the Camden and Amboy Railroad. This engine, afterward called the "John Bull" and "No. 1," was completed in May and shipped by sailing vessel from New Castle-on-Tyne in June, 1831, arriving in Philadelphia about the middle of August of that year. It was then transferred to a sloop at Chestnut-street wharf, Philadelphia, whence it was taken to Bordentown.

The "John Bull" Arrives at Bordentown.

The following circumstances connected with the arrival of the engine at Bordentown, N. J., are related by Isaac Dripps, Esq., for many years master mechanic of the Camden and Amboy Railroad, and afterwards superintendent of motive power of the Pennsylvania Railroad, who is now, after a busy life, enjoying a peaceable retirement at his pleasant home in West Philadelphia.

Mr. Dripps, who is now in the eighty-second year of his age, was employed by Robert and Edwin Stevens in repairing and assisting with their steamboats on the Delaware river and at Hoboken as early as 1829. When the "John Bull" arrived in Philadelphia he was detailed by Robert Stevens to attend to the transportation of the engine to Bordentown, where it was landed safely the last week in August, 1831.

The boiler and cylinders were in place, but the loose parts — rods, pistons, valves, etc.— were packed in boxes. No drawings nor directions for putting the engine together had come to hand, and young Dripps, who had never seen a locomotive, found great difficulty in discovering how to put the parts in place, alone and unassisted, as Robert Stevens, who had returned from Europe, was absent at Hoboken at the time attending to other matters.

Dimensions of Engine and Parts.

The bronze bas-relief upon the monument, made from the working drawing furnished by Mr. Dripps, is an exact representation of the locomotive when it arrived in America.

The engine originally weighed about ten tons. The boiler was thirteen feet long and three feet six inches in diameter.

The cylinders were nine inches by twenty inches. There were four driving wheels four feet six inches in diameter, arranged with outside cranks for connecting parallel rods, but owing to the sharp curves on the road these rods were never used. The driving wheels were made with cast-iron hubs and wooden (locust) spokes and felloes. The tires were of wrought iron, three-quarters of an inch thick, the tread being five inches and the depth of flange one and a-half inches. The gauge was originally five feet from center to center of rails. The boiler was composed of sixty-two flues seven feet six inches long, two inches in diameter; the furnace was three feet seven inches long and three feet two inches high, for burning wood. The steam ports were one and one-eighth inches by six and a-half inches; the exhaust ports one and one-eighth by six and a-half inches; grate surface, ten feet eight inches; fire-box surface, thirty-six feet; flue surface, two hundred and thirteen feet; weight, without fuel or water, twenty-two thousand four hundred and twenty-five pounds.

After the valves were in gear and the engine in motion, two levers on the engineman's side moved back and forth continuously. When it was necessary to put the locomotive on the turntable, enginemen who were skilled in the handling of the engines first put the valves out of gear by turning the handle down, and then worked the levers by hand, thus moving the valves to the proper position and stopping the engine at the exact point desired.

The reversing gear was a very complicated affair. The two eccentrics were secured to a sleeve or barrel, which fitted loosely on the crank-shaft, between the two cranks, so as to turn freely. A treadle was used to change the position of this loose eccentric sleeve on the shaft of the driving wheel (moving it to the right or left) when it was necessary to reverse. Two carriers were secured firmly to the body of this shaft (one on each side of the eccentrics); one carrier worked the engine ahead, the other back. The small handle on the right side of the boiler was used to lift the eccentric-rod (which passed forward to the rock shaft on the forward part of the engine) off the pin, and thus put the valves out of gear before it was possible to shift the sleeve and reverse the engine.

Great similarity will be noticed in the American locomotives built for many years after the arrival of the "John Bull," especially in the matter of making the keys, brasses, etc., on the connecting-rods, and in the construction of valves, fire-box and tubes. Even the old plan of setting the ends of the exhaust-nozzle high up in the smoke-box, which was discontinued when the petticoat pipe came in use, is now again resorted to in connection with the extended smoke-box of modern locomotives.

First Trial of the Locomotive.

Mr. Dripps informs me that, after many attempts, he succeeded in putting the parts of the engine together, and when it was placed in position upon the track he notified Robert Stevens of the fact. Mr. Stevens came at once to Bordentown, as his anxiety to see it in operation was very great. Upon his arrival the boiler was pumped full of water, by hand, from the hogshead in which it was brought. Benjamin Higgins made the fire with pine wood, and when the scale * showed thirty pounds steam pressure, Isaac Dripps opened the throttle, Robert Stevens standing by his side, and the first locomotive on this great highway *moved*. It would be difficult to describe the feeling of these three men as they stood upon the moving engine — the first human freight drawn by steam on what was afterwards destined to be the great highway connecting the two most populous cities of the American Continent; a most important link in the chain of intercommunication between the North and South and West. What possibilities must have dawned upon them if they cared to lift the veil of the future!

During the next few days after this preliminary trial the engine was again taken apart, and as a few of the parts needed modification some time intervened before it was again in running order. It will be remembered that young Dripps had never seen a locomotive before, and there were no "old engineers" to consult in regard to the construction or management of the engine.

* The dial gauge was not in use at that time.

A Tender Improvised.

As no tender came with the locomotive, one was improvised from a four-wheel flat car that had been used on construction work, which was soon equipped to carry water and wood. The water tank consisted of a large whiskey cask which was procured from a Bordentown storekeeper, and this was securely fastened on the center of this four-wheeled car. A hole was bored up through the car into the barrel and into it a piece of two-inch tin pipe was fastened, projecting below the platform of the car. It now became necessary to devise some plan to get the water from the tank to the pump and into the boiler around the turns under the cars, and as a series of rigid sections of pipe was not practicable, young Dripps procured four sections of hose two feet long, which he had made out of shoe leather by a Bordentown shoemaker. These were attached to the pipes and securely fastened by bands of waxed thread. The hogshead was filled with water, a supply of wood for fuel was obtained, and the engine and tender were ready for work.

Steam or Horse Power?

At that time the question whether the railroad should be operated by steam locomotives or horse power had already become a political issue. The farmers and other horse owners and dealers, who had made money by selling hay and grain and horses to the stage and freight-wagon lines, were discussing the possibilities of loss of business.

Trial of the Engine Before the Legislature.

Many of the members of the New Jersey Legislature were farmers. The management of the Camden and Amboy Railroad was anxious to give these gentlemen and other prominent citizens an opportunity to examine a steam locomotive at work and to ride in a railway train.

Sixty years ago to-day, on the 12th of November, 1831, by special invitation, the members of the Legislature and other State officials were driven from Trenton to Bordentown in stages to witness the trial. Among them were John P. Jackson (father of the present general superintendent of the United

Railroads of New Jersey division of the Pennsylvania Railroad, who afterwards took a prominent part in the affairs of the New Jersey Railroad, whose termini were at New Brunswick and Jersey City); Benjamin Fish (director for fifty years for the Camden and Amboy Railroad), afterwards president of the Freehold and Jamesburg Agricultural Railroad; Ashbel Welch, chief engineer and superintendent of the Belvidere and Delaware Railroad for many years, and president of the United Railroads of New Jersey during the years immediately preceding the lease to the Pennsylvania Railroad; Edwin A. and Robert L. Stevens, afterwards managers of the road.

First Cars.

Two coaches built so that they might be drawn by horses were attached to the locomotive. These coaches were of the English pattern. They had four wheels and resembled three carriage bodies joined together, with seats in each facing each other. There were three doors at each side. These cars were made by a firm of carriage manufacturers, M. P. and M. E. Green, of Hoboken, and were thought to be very handsome. The New Jersey law-makers were somewhat dubious, it is said, about risking their lives in this novel train, but at last they concluded to do so and the train started and made many trips back and forth without accident or delay. Madam Murat, wife of Prince Murat, a nephew of Napoleon Bonaparte, who was then living in Bordentown, insisted on being the first woman to ride on a train hauled by a steam locomotive in the State.

In the evening a grand entertainment was given to the Legislature by the railroad company at Arnell's Hotel, Bordentown, and it has been whispered that the festivities kept up until a late hour in the night. Whether that be true or not, it is generally conceded that from that time to this the Legislature of New Jersey have always been more or less interested in the affairs of the Camden and Amboy Railroad and its successors, or *vice versa*.

This first movement of passengers by steam in the State of New Jersey was regarded as a success from every point of

view, and in commemoration of the important events here enacted the boundaries of this first piece of railway laid between New York and Philadelphia, which were identified and staked out by Isaac Dripps a half century afterwards, have been definitely marked for all time by the Pennsylvania Railroad Company, who have erected these handsome stones.

Early Difficulties.

Among the earliest troubles of the young engineer and his employer, Robert L. Stevens, was the fact that as there were only four wheels under the engines they were derailed frequently in going around curves, so it was necessary to provide an appliance to prevent this.

The First Pilot.

The first pilot was planned, 1832, by Robert L. Stevens. A frame made of oak, eight by four feet, pinned together at the corners was made: Under one end of it a pair of wheels twenty-six inches in diameter were placed in boxes, and the other end was fastened to an extension of the axle, outside of the forward driving wheels, it having been found by experience that a play of about one inch on each side on the pedestals of the front wheels of the pilot or engine was necessary in order to get around the curves then in the tracks. For years afterwards there was very little change in constructing the pilots from that originally applied to the "John Bull."

The spiral spring, which held the front wheels of the pilot in place, acted substantially as the center pin of a truck. The turntables in use on the road were so short that it was necessary to unconnect and take off these pilots before turning the engine. After the pilot was adopted the forward large wheel on right of the engine was made loose on the shaft in order to afford additional play in going around curves. Other * changes and additions were also made in the locomotive.

* Changes in the locomotive "John Bull" since date of construction, 1830:

Steam dome changed from rear of boiler, forward to a part over what was called the "man-hole," and throttle-valve placed therein.

Steam-pipes changed to outside of boiler, connecting new dome with smoke-box, entering it on each side.

Improvements in Locomotive Building.

During 1831–35 the company's shops were located at Hoboken, N. J., and during the winter of 1832–33, three locomotives were commenced at these shops (two completed before March, 1833, the other in April), the valves, cylinders, pistons, etc., coming from England, the boilers being made under the direction of Robert L. Stevens. It was his opinion that the "John Bull" was too heavy and the new boilers were built smaller and lighter, so that the engines, when completed, weighed eight instead of ten tons. With these three engines, which were delivered to the railroad company at South Amboy, the stone blocks and other material for the permanent track was delivered along the line of the road.

Baldwin's First Locomotives.

The importation of the locomotive "John Bull" was destined to have a far-reaching influence in moulding the types of early American locomotives.

After the demonstration of November 12, 1831, the engine was taken from the track and stored in a shed constructed to protect it until such time as the track should be completed.

It was about this time that the proprietor of Peales' Museum, in Philadelphia, applied to Matthias Baldwin, an ingenious

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In the beginning the reverse gear was changed from one single eccentric rod on each side to two on each side, connecting on to the same eccentric wheel, and the lifting rod, in pulling back, lifted the forward gear-hook off the rocker-arm, and the back-motion hook then connecting on the rocker-arm reversed the engine.

Side rods were never used.

Driver spring was changed from a bearing under the pedestal boxes to a point over the boxes.

The pilot was attached in this manner:

Right forward wheel being loose, forward axle extended eight inches beyond box on each side; to this was attached the beam of the pilot, having play of about 1 inch between box and pedestal-plate to act while going around curves. The weight of forward part of engine rested upon a cross-brace of the two-wheel pilot, which took bearing by a screw-pin surrounded by a spring, by turning which pin the weight on the drivers could be adjusted.

A brace used as a hand-rail was added on top of the frame, bracing frame and acting as a guide to the driving springs.

Water-cocks changed from right to left side of boiler.

Bell, whistle and headlight were added.

Balance safety-valve scale was changed forward to a point over barrel of boiler, the secret valve being over the new dome.

mathematical instrument maker, for a small locomotive to run upon a circular track on the floor of the museum. Mr. Baldwin had heard of this locomotive. He came to Bordentown and applied to Isaac Dripps for permission to inspect it. Mr. Dripps tells me he remembers very well the day that he explained to Mr. Baldwin the construction of the various working parts.

Mr. Baldwin built a toy engine for Mr. Peale, which was so successful, that in 1832 he was called upon by the Philadelphia and Germantown Railroad Company to construct the old "Ironsides," * which was similar in many ways to the "John Bull," as an examination of the model preserved in the National Museum will show. The success of this engine laid the foundation for the great Baldwin Locomotive Works, which is in existence to-day, sending locomotives to every part of the globe.

The Line from Bordentown to South Amboy.

The Camden and Amboy Company having obtained control of the steamboat routes between Philadelphia and Bordentown, and between South Amboy and New York, directed their energies to completing the railway across the State.

Although the grading of the road from Bordentown to Camden had been commenced in the summer of 1831, work on that end of the line was abandoned for about two years, the entire construction force being put on the work between Bordentown and South Amboy.

The road from Bordentown to Hightstown was completed by the middle of September, 1832, and from Hightstown to South Amboy in the December following. The "deep cut" at South Amboy, and the curves of the track there, gave the civil engineers great trouble.

The First American Standard Track.

The laying of the track through the "deep cut" led to an event of great importance to future railway construction. The authorities at Sing Sing having failed to deliver the stone

*A handsome model of the "Ironsides" was presented to the U. S. National Museum by the Baldwin Locomotive Company in 1888.

blocks rapidly enough, Mr. Stevens ordered hewn wooden cross-ties to be laid temporarily, and the rail to be directly spiked thereto. A number of these ties were laid on the sharpest curves in the cut. They showed such satisfactory properties when the road began to be operated that they were permitted to remain, and the stone blocks already in the track were replaced by wooden ties as rapidly as practicable. Without doubt the piece of track in "deep cut" was the first in the world to be laid according to the present American practice of spiking the rail directly to the cross-tie.

The Line Opened Between Bordentown and South Amboy.

Among the memoranda compiled by Benjamin Fish, published in his memoir, I find the following:

"First cars were put on the Camden and Amboy Railroad September 19, 1832. They were drawn by two horses. They took the directors and a few friends from Bordentown to Hightstown and back.

"On December 17, 1832, the first passengers were taken from Bordentown through to South Amboy. Fifty or sixty people went. It was a rainy day.

"On January 24, 1833, the first freight cars were put on the railroad. There were three cars, drawn by one horse each, with six or seven thousand pounds of freight on each car.

"Freight came from New York by steamboat to South Amboy. I drove the first car, John Twine drove the second car and Edmund Page the third one. We came to the Sand Hills (near Bordentown) by railroad, there loaded the goods on wagons (it was winter, and the river was frozen over), arriving in Philadelphia by sunrise next morning. The goods left New York at 12 o'clock, noon. This was done by the old firm of Hill, Fish & Abbe."

Immediately after the road from Bordentown to South Amboy was completed, and as late as the summer of 1833, passengers were brought from Philadelphia to the wharf at White Hill by steamboat, and from there were rapidly driven to Amboy. Two horses were hitched to each car, and as they were driven continuously on the run, three changes of horses

were required, the finest horses obtainable being purchased for this purpose. The time consumed in crossing the State (thirty-four miles) was from two and a-half to three hours.

Early in September, 1833, the locomotive "John Bull" was put on the train leaving Bordentown about 7 o'clock in the morning, and returning leaving South Amboy at 4 P. M. This was the first passenger train regularly run by steam on the route between New York and Philadelphia.

U. S. NATIONAL MUSEUM.

THE LINE OPENED FROM BORDENTOWN TO CAMDEN.

In the spring of 1833 work was again commenced, and proceeded with such vigor as to permit the road to be operated from Bordentown to below Rancocas creek (twelve miles) in the late fall and winter of 1833.

At that time stage-coaches left Toy's Hotel, Camden, at 8 A. M. and 3 P. M., conveying passengers to Rancocas; from there cars and locomotive conveyed them to Bordentown, where the locomotive was detached, horses hauling the cars through to and from South Amboy, except one line which was run all the way through by a locomotive after October, 1833.

In January, 1834, the late Robert C. Buzby (who, on the 4th of March, 1883, completed a half century of continuous service in the employ of the company) ran the first engine — No. 2 — into Camden in the morning to bring the mail out in the afternoon, and George Vernon ran the first regular train that carried the mail into Camden the same day.

In a letter Mr. Buzby thus described his first trip to Camden:

"I left Bordentown at 9 A. M. with the mail, and ran as far as Cooper's creek bridge, Camden, which was not completed, so I was compelled to take the engine back to the temporary engine house near Pensaukin creek. There the engine was laid up for the night. It was bitter cold, so I remained with the engine all night to keep it from freezing up. Next morning early Edwin A. Stevens drove out in a sleigh and reported that the bridge was ready for travel, so we took the engine down to bring out the mail train in the afternoon. Edwin Stevens rode with me on the engine. He insisted on my running fast over what is now called Haddon Avenue crossing,

which I did, but owing to the frozen mud the *snow plow and pilot* were thrown off the rails, and I had to get off and put them on the track before we could go on."

Growth of the Railroad System in New Jersey.

The Camden and Amboy Railroad as originally constructed consisted of a single-track railway from Camden to South Amboy, sixty-one miles.

During the years 1830–31–32 nine railroad companies* and four canal companies were chartered by the Legislature of New Jersey.

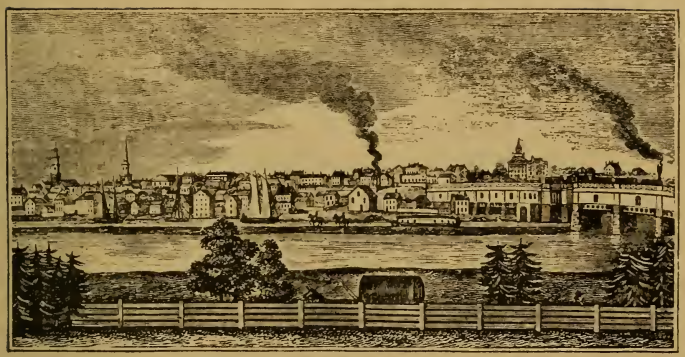
This was the state of the development of the railroad system of New Jersey in January, 1834, when the road from Camden through to South Amboy was opened for traffic.

Control Obtained of the Philadelphia and Trenton Railroad.

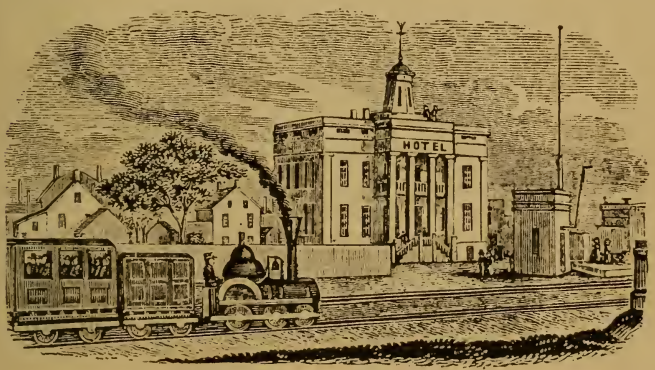
In Pennsylvania the Philadelphia and Trenton Railroad Co., chartered February 23, 1832, had nearly completed the road from Morrisville (opposite Trenton) to Bristol in 1833, and thence to Kensington in the beginning of 1835, and had secured a majority of the stock of the Trenton Bridge Company

* 1. Feb. 4, 1830—Camden and Amboy R. R. and Transportation Co., Camden to South Amboy, ... $1,000,000
2. Jan. 21, 1831—Paterson and Hudson River R. R., opposite N. Y., Paterson through to the Hudson, ... 250,000
3. Feb. 3, 1831—Paterson Junction R. R., ... 20,000
4. Feb. 12, 1831—West Jersey R. R., from C. & A. R. R., near Camden, to any point in Penn's Neck, Salem Co., 500,000
5. Feb. 9, 1831—Elizabethtown and Somerville and Plainfield, through Bound Brook, ... 200,000
6. Mar. 7, 1832—New Jersey R. R., from New Brunswick to Jersey City, through Woodbridge, Railway, Elizabethtown and Newark, ... 750,000
7. Mar. 8, 1832—Paterson and Fort Lee R. R., from Paterson to Fort Lee on the Hudson, ... 200,000
8. Mar. 8, 1832—New Jersey, Hudson and Delaware, from any point on the Delaware between N. Y. State line and mouth of Paulins Kill, Sussex Co., to the Hudson opposite N. Y., but not to cross the Passaic south of Belleville, nor to run south of the turnpike road from Newark to Jersey City, ... 1,000,000
9. Feb. 11, 1833—Delaware and Jobstown Rail and Macadamized Road, from near mouth of Craft's Creek (below Bordentown) on the Delaware to New Lisbon, through the villages of Columbus, Jobstown and Johnstown, . 60,000

From Illustrations in
HISTORICAL COLLECTIONS OF NEW JERSEY.
By John W. Barber and Henry Howe, 1844.



N. E. VIEW OF NEW BRUNSWICK, N. J., 1842.
On the right is seen the Railroad Bridge, above which, on an eminence, is seen Rutger's College. The Delaware and Raritan Canal, passing along Raritan River, is seen in front of the city.



CENTRAL PART OF RAHWAY, 1842.

S. E. VIEW OF JERSEY CITY, FROM NEW YORK, 1842.
The above shows the appearance of Jersey City as seen from near the Battery, in New York. The works of the Jersey City Glass Co. are seen on the left; the car house of the New Jersey Railroad is seen on the right.

and the Trenton and New Brunswick Turnpike Company. They also claimed that the right to lay rails on the turnpike was authorized by the charter of the latter company.

The financial success * of the Joint Companies caused other capitalists to covet the right to build a road across the State. The "Anti-monopolists" were loud in their clamor and had published a pamphlet entitled "A Proposition to Abolish Ex- "clusive Privileges in New Jersey," which had been issued and widely read. To satisfy their demands the Legislature of 1835 had appointed a committee to confer with the Camden and Amboy Company in regard to the purchase of their works by the State.

The New Jersey Railroad Opened.

The New Jersey Railroad, which had opened its line † from the Hudson river as far as Elizabeth in 1834, had almost completed the line through to New Brunswick in the latter part of '35, and rumors were numerous as to rival roads, the public being wrought up to a high pitch of excitement by discussions in the press and by public meetings.

In order to avoid litigation, Captain Stockton and others interested quietly bought up a controlling interest in the stock of the Philadelphia and Trenton Railroad, and obtained control also of the bridge at Trenton and the turnpike from Trenton to New Brunswick, thus putting an end to opposition from that quarter.

Agreement Ratified with the New Jersey Railroad.

In September, 1836, the Joint Companies and the Philadelphia and Trenton Railroad Company entered into an agreement with the New Jersey Railroad, in which they covenanted to build a railroad from Bordentown to New Brunswick in order to complete an all-rail through line from Philadelphia to New York. It was also agreed, when the road was completed, "that the price for passage from New "York to Philadelphia shall be $4.00 for day passengers and "$5.00 for night passengers, and the receipts from passengers

*The stock was selling at $134 in July, 1835, par $100.
† See description among branch roads.

"be divided in *pro rata* proportion as to the length of the respec-
"tive railroads used in this transportation," the fare by the old route from Philadelphia *via* Bordentown and Amboy to remain at "the present rate of $3.00 for regular passengers "and $2.00 for forward deck passengers."

The agreement was signed by R. F. Stockton, president Delaware and Raritan Canal; R. L. Stevens, president Camden and Amboy Railroad and Transportation Company; J. F. Darcy, president New Jersey Railroad and Transportation Company; John Nagly, president Philadelphia and Trenton Railroad, and is probably the first agreement made in this country to provide for the pooling of railroad earnings.

Financial Troubles and Panic of 1837.

When this agreement was ratified arrangements were made to commence and complete the road promptly,* but a crisis in the money market followed the failure of the United States Bank, and the disastrous panic of 1837 caused a halt.

On April 11, 1837, the board of directors having been notified "that certain sterling bills of exchange, guaranteed by "the Bank of the United States, on Baring Brothers & Co., of "London, had gone to protest, and as the construction of the "contemplated railroad from Bordentown to New Brunswick "requires an immediate loan of $1,000,000," the secretary of the company was directed "to urge upon him (Captain Stockton) the indispensable necessity of his acceptance of the appointment to go to London and attempt the negotiation of four hundred and fifty sterling $500 six per cent. bonds for the completion of the road." †

The appointment was accepted and Captain Stockton sailed for Europe. On September 18, 1837, the board had received bills of exchange amounting to £82,888 5*s.* 8*d.* from Captain Stockton, and notwithstanding the fact that during the summer and fall of 1837 the business of the country languished,

* The right to build this road was conferred by the Act approved March 2, 1832, requiring the C. & A. Co. to build a road to New Brunswick from a point at or west of Spottswood as soon as the road from Jersey City to New Brunswick was built.

† One of the first negotiations of American R. R. securities in a foreign market.

the work on the proposed road from Trenton to Bordentown was "commenced in September, 1837, and passengers carried "upon it in 1838. This road branched from the main line of "the Camden and Amboy Railroad in the borough of Borden-"town, at Prince street, following around the edge of the hill "and crossing the Crosswick's creek immediately upon above "the mouth or entrance of the Delaware and Raritan Canal, "thence following the tow-path on the right bank of the canal "to Trenton." *

Lease of the Canal: Failure to Comply with Agreement.

Negotiations for the lease of the Delaware and Raritan Canal by a syndicate of capitalists had been going on for some time, and in 1837 an agreement was signed by S. L. Southard, of Trenton, and D. B. Ogden, of New York, on their part, and by R. F. Stockton and R. L. Stevens, on the part of the joint companies, to lease the canal for fifteen years —at an average rate of 6 per cent., to be paid (4 per cent. first year, 5 per cent. second year, and 6 per cent. third year and 6½ per cent. for each of the remaining twelve years) "upon "the said cost to be ascertained by the books of the said com-"pany"— the parties stipulating "that they will not transport, "nor permit any other persons to transport, any passengers on "said canal." Upon the basis of this lease Captain Stockton succeeded in negotiating the proposed loan. For some reason the terms of this lease were never carried out by Messrs. Southard and Ogden, much to the chagrin of Captain Stockton, who had succeeded in negotiations with the English capitalists, largely through the confidence given in the credit of the joint companies by the lease of the canal. On the 18th November a letter was received from him, stating to the board "that rumors had been circulated [in England] that the whole "matter of the lease was a mere device to enable him to "impose upon the confidence and credulity of capitalists in "England; while the character of Messrs. Ogden and Southard "might satisfy the public in the United States, that in Eng-"land nothing but the names of those parties who were spoken

* Original Report to Stockholders, 1840.

"of at the time of making the lease as having abundant "means, and their reasons for not complying with their con- "tract, would satisfy the capitalists who had loaned their "money in consideration of that lease, and rescue my charac- "ter from the imputation that had been cast upon it at home "as well as abroad."

Through All-Rail Route Demanded.

The managers of the New Jersey Railroad had become most anxious. They saw the necessity of the completion of the through connection to Philadelphia, and were disappointed with the delay in getting the road from Trenton to New Brunswick built. Over a year and a-half had elapsed since the agreement of September, '36, and not a spade had been put in the ground west of New Brunswick for this line.

Railroad from Trenton to New Brunswick Completed.

Commodore Stockton, notwithstanding the fact that he was hampered by the reports involving his integrity, was able to consummate the negotiations of enough bonds to pay for the construction of the road, and in June, 1838, the grading was commenced; the work was pushed so vigorously that in six months from that time the twenty-four miles of road to Trenton was completed.

The branch from Trenton to New Brunswick originally followed the tow-path on the east bank of the Delaware and Raritan Canal, about thirteen miles, to a point near Kingston, "thence for some distance on the present Rocky Hill branch, "up the valley of Heathcote brook, to its summit between it "and Lawrence brook, on what was called Long Bridge "Farm, thence down Lawrence's brook to Dean's mill- "dam* near George's road, thence in a straight line in the "direction of New Brunswick to its intersection with the New "Jersey Railroad† about three and a-half miles from the rail- "road bridge over the Raritan river at New Brunswick. ‡

* This portion of the line was abandoned several years ago.

† The N. J. R. R. had been built as far west as the city limits of New Brunswick would allow, so that the length of the Trenton and New Brunswick branch was diminished 3½ miles.

‡ Original description in survey.

All-Rail Route Philadelphia to New York Completed.

This first through all-rail line from Philadelphia to New York, which is now one of the most valuable railroad properties in the world, was put in full operation January 1, 1839. For a number of years trains changed engines at Trenton and New Brunswick, and not unfrequently thirty or fifty minutes were consumed in "wooding-up" the tenders at the wood-sheds along the line.

Gradually additional facilities in the way of close connections,* etc., were completed and through cars were put on the trains. The saving in time by the all-rail route from Philadelphia to Jersey City made it a most popular line.

In 1839 the Trenton bridge was rebuilt to carry locomotives. Previous to that time passengers had been hauled from Morrisville across the river in stages drawn by horses, the New York cars being near the river bank to receive them. The rivalry of competing lines, who conveyed passengers to Trenton by boat and thence to New Brunswick by "Captain "Reeside's celebrated drivers" and other stage lines, was broken up by the opening of the railroad from Trenton to New Brunswick in January, 1839, and the gaily-painted stage-coach, with its prancing steeds and dashing drivers, became a thing of the past.

* Up to 1840 all passengers changed cars and walked over the canal bridge at Trenton because the gauge of the Philadelphia and Trenton railroad was 5 ft., while the Camden and Amboy gauge was 4 ft. 8½ in.

METHOD OF MANAGEMENT.

Although there was practically but one company, as Commodore Stockton (and his father-in-law, John Potter, owned the majority of the stock in the canal) they directed its affairs; the Stevens brothers, Robert L. and Edwin (with their father, John Stevens) became the active managers of the road. The former took charge of laying the track and procuring equipment, while the other looked after the political, financial and practical management of affairs. Considerable judgment had to be used in both of these branches. No laws had been established in regard to the steps to be taken in the purchase of right of way, and many of the New Jersey legislators were very chary when they were asked to grant franchises and rights. In Mr. Robert L. Stevens's department the field was indeed wide. The few short railways built at that time were isolated and separated by considerable distance, which in those days was a difficulty not easily surmounted. When we think of the fact that Robert L. Stevens was compelled to begin to lay track and provide engines and cars for a railroad with no experience to guide him, and with no experienced railroad men to consult, we can form some idea of the responsibility which rested upon his shoulders and the perplexing problems he was called upon to solve. But the son of the great inventor "knew no such word as fail," and he bent himself to the task with a success that was remarkable.

Early Design.

As has been said before the organization of the Camden and Amboy Railroad was the outgrowth of the Union Line, which carried nearly all the freight across the State. The road was originally designed to be run, if necessary, by horse power, which was regarded as a certainty, while steam was looked upon, as an expensive possibility only, by some of the directors. So in the early plans of the construction of the road, conveniences for operating it by horse power were especially looked after.

The railroad was built upon the most approved plan, no money being spared to make it substantial in every particular. The canal was built for the accommodation of heavy and bulky freight—lumber, coal, etc. Upon the railroad nothing was to be carried besides passengers and their baggage except, perhaps, what we would now call box freight and express goods, the idea being that the engines and cars should be as light as possible so long as safety was assured.

In 1840–50 many experiments were made by the Camden and Amboy Railroad in order to test wood preservatives. At Bordentown large tanks were constructed for "kyanizing" ties and planks: the timber was cross-piled, layers of lime and salt being put on at intervals, the remaining space being filled with water and the timber allowed to saturate in this solution for several days. In some cases the wooden "sleepers," as the cross-ties were then called, were laid in trenches filled with lime; sometimes the ties were charred and sometimes coated with tar.

None of these experiments having proven of sufficient practical benefit they were abandoned. But they are, however, interesting to recall, as they show the energy displayed by the early managers of the road in their desire to preserve and perfect the track superstructure.

The Agreement with the State.

By the charter of these companies the canal was to revert to the State in fifty years and the railroad in thirty years * from the date of their completion, at fair valuation, if the State desired. This arrangement entailed a peculiar condition of affairs in respect to ownership, etc. The directors, in their report to the stockholders in 1840, called attention to the fact as follows:

"We now proceed to say a word or two in relation to the "value of your property and the terms by which you hold it.

* This was changed by act of March 16, 1854—the time when the purchase could be made by the State of the railroad being made the same as the canal, "and not sooner," and "the time for the appointment of the "appraisers provided for in the 25th section of the act incorporating the "canal, and the 22d section of the act incorporating the said railroad "company, is hereby fixed and declared to be in the year 1888."

"Although you have paid for it, and New Jersey has not advanced or loaned you a dollar on it, still the fee is in her — not in you. You are the lessee for a term of years only, and the State can, after reimbursing you, dissolve the corporation — the railroad at the expiration of thirty years from and after its completion, the canal at the expiration of fifty years from and after its completion. The relation that exists between you and the State is simply that of landlord and tenant, with restrictions dictated by the State and ratified by different legislatures.

"You now furnish the State of New Jersey an annual sum sufficient to pay the expenses of the State government, and which will no doubt increase so as to enable her, by this means, to purchase all your works at the expiration of the lease you hold under her."

Although this matter was always brought prominently before the people by the companies whenever additional privileges were asked for, the corporation had many enemies. As early as 1835 the Legislature passed the following resolution:

"*Whereas*, by laws heretofore passed by the Legislature of this State, certain exclusive privileges were conferred upon the Delaware and Raritan Canal and Camden and Amboy Transportation Company; and

"*Whereas* it is represented that a large portion of the people of New Jersey are desirous that exclusive privileges should be extinguished in some just, honorable and legal manner; and

"*Whereas* it is manifest that the desirable object can alone be attained by and with the consent of said companies; therefore

"RESOLVED, That a committee of seven (7) be appointed to inquire of said companies whether they are willing to surrender to the State the whole of their works, and if so, on what terms."

PROPOSITION TO THE STATE TO PURCHASE.

Seven million one hundred and sixty-five thousand dollars was the price named by the companies, and simultaneously with this offer to the State the Philadelphia and Trenton Railroad Company and the Trenton and New Brunswick Turnpike Company offered to lease these works from the State at six per cent. per annum ($459,000) for thirty-six years and, in addition, to pay the State twenty-five cents on every passen-

ger carried across the State. These negotiations, however, fell through, and the railroad and canal were conducted upon the original policy.

To those who viewed public sentiment closely, and the Messrs. Stockton and Stevens should certainly be classed among that number, it began to be evident that the popular feeling throughout the Commonwealth was against the purchase of these works by the State. "As long as the revenue "to the State from transit duty, etc., amounted to such a "handsome sum, why should the State want to go into the "railroad business?" was the question asked. Although this proposition to the State was kept uppermost in the minds of the people by documents and public utterances, the more shrewd observers of events were satisfied that the transfer would never be made. The charter to these companies, however, worded as it was, "That it shall not be lawful at "any time during the said railroad charter to construct any "other railroad in this State without the consent of said com- "panies, which shall be intended or used for the transporta- "tion of merchandise between the cities of New York and "Philadelphia, to compete in business with the railroad "authorized by this act," was the bone of contention over which legislatures battled, and the friends and foes of the corporation were engaged in continual warfare.

The "Monopoly" Brings Prosperity to the State.

Although the joint companies were protected by this legislative enactment, the Messrs. Stevens and Stockton were not enabled to conduct the road and canal without fear of rivals, as they were compelled to combat many ingenious devices which were attempted in order to construct competing lines.

As the world moves changes take place in the policies of nations, States and even corporations.

To-day, when a general railroad law exists in New Jersey and no railway can prevent another from being built by its side, the carrying companies vie with each other to provide speedy trains, comfortable cars and stations, and what is far more necessary, they take every possible precaution against

accident, believing that the public appreciates "safety, speed and comfort," and that they will patronize the road which will give them the best opportunity to enjoy these essentials.

With the early managers of these companies such matters, while thought of, were not regarded of such vital importance.

Monopoly of the stage route, monopoly of the bridge, monopoly of the turnpike, had been the policy of the State in order to encourage internal improvements.

Colonel John Stevens had been driven from the Hudson with his boats by Fulton. Potter had invested his fortune in the canal under the State guarantee of defense against rivals, and they and others believed that they were entitled to protection from competition. They argued that they had risked their time and money in an enterprise the success of which was doubtful.

They foresaw much of the future prosperity of the State, it is true, but they believed that the sole control of the lines of communication between the cities of New York and Philadelphia *was a right* that they should never be asked to relinquish.

In the early strides of progress in every new country such protection is necessary and has generally been granted, and throughout the many and bitter contests in courts and legislative halls the managers of the joint companies during the first twenty-five years of their existence were almost always successful. As the railroad paid a tax to the State on each passenger that it carried across the State, and as the business of the road increased rapidly, the treasury of the State received a handsome sum each year, and as, according to the charter, the day might come when the property of the road (if the State purchased it at the end of thirty years) might be a matter of vast importance to the State, it is easy to see upon what grounds the railway managers asked for and received protection from proposed competing lines.

While we are tempted at this day to criticise adversely the public men who lent their assistance to such legislation as this, we should also consider the important results to the Commonwealth that were brought about by the determined battles which the early friends of this railroad fought in defence of what they believed to be their rights.

As the business of the country developed the necessity for other lines of communication became apparent to those, especially of a younger generation, who argued that this company had been protected long enough. They pointed to the fact that large dividends had been declared, and they claimed that the owners of these roads should not continue to prevent the development of the business and resources of the State simply for their own pecuniary benefit. But with the Messrs. Stockton and Stevens the sole right to control the traffic between New York and Philadelphia was an inborn principle which they never relinquished while they were at the helm.

Growth of the Business.

It is estimated that 2,000 persons each way passed over the public road from New York to Philadelphia in 1790, the Union Line and all opposition lines carrying about 2,800 in 1825. In 1832, the first year the Camden and Amboy line was opened, it is estimated that the "through passenger "business was about 52,000."

The through business for the succeeding years was as follows:

	Tons of Freight via C. & A. R. R.	*Tons of Freight via D. & R. Canal.*	*Passengers via C. & A. R. R.*
1835	6,875	57,736	147,424
1840*	11,325	172,120	153,112
1850	42,242	568,403	345,425
1860	183,750	1,639,998	479,330

The New York and Newark Railroad.

According to the charter of the N. J. R. R. (March 1, 1832) that company was permitted "to make a branch road to any "ferry on the Hudson river opposite New York which shall "join the main road within 100 yards of the Hackensack river

* Averaging a carload at 31 passengers, about 5,000 carloads of through passengers were carried in 1840 — about 17 carloads a day. Two trains each day each way, of 4 cars each, would have done the entire business. Only 15 first-class passenger cars were then owned by this company. The freight business quadrupled each decade on the railroad and tripled on the canal; the passenger business tripled in the first eight years, more than doubled in the next decade and increased 40 per cent. in the next.

"* * * or at such point as shall best give to the ferries equal "facilities for communication with Newark, and if the com- "pany do not construct such branch as soon as the main road "from Newark to the Hudson shall be made, the law author- "izes the said ferry to do so with the same power and liabili- "ties as the company."

The ferry alluded to was the Hoboken Ferry, in which the Messrs. Stevens owned a large interest, and the differences of opinion between them and the managers of the New Jersey Railroad in regard to this clause in the charter was one cause that led to famous legislative conflict of 1860–1865.

The Great Railroad Conflict.

The New Jersey Railroad had been restless for some time. By the terms of their agreement with the Camden and Amboy Railroad they only received one-sixth of the gross through receipts, as their road, while comprising one-third of the all-rail line between Philadelphia and New York, was only one-sixth of the total length of both roads. An application for the road over from Millstone "for local purposes" was before the Legislature. The exclusive privileges given to the Camden and Amboy Railroad were denounced as unconstitutional. Opinions were obtained from the most distinguished jurists in the country in regard to the matter. The government even was appealed to to build a "post road" from Washington to New York.

The War of the Rebellion followed in 1861, and the importance of the line between Trenton and New York became more and more apparent. The Camden and Amboy Company were considering the propriety of pushing their own road across the State from New Brunswick towards Hoboken, and a crisis in railroad affairs had arrived.

The United New Jersey Railroad and Canal Co.

The more conservative directors of the two companies saw that if this condition of affairs continued long the second road *

* On the 16th of March, 1854, the Legislature of New Jersey had passed a law by which it was enacted: "That after the first day of January, in "the year 1869, it shall be lawful, without the consent of the said Dela- "ware and Raritan Canal and Camden and Amboy Railroad and Trans-

would soon be built, and that it would result in the companies coming together in a compromise at the end with increased capital. Finally negotiations were entered into in 1865, and concluded during the fall and winter of 1866, by Ashbel Welch on the part of the Joint Companies, and Hamilton Fish for the New Jersey roads.

Robert L. Stevens having died in 1856, Edwin A. Stevens was the only early manager of the road who remained to take part in this conflict. He at first was inclined to favor the negotiations, but not being able to agree with the committee appointed to make the merger, owing to his belief that the concession offered in the valuation of New Jersey Railroad stock was too liberal, he practically withdrew from the management of the companies and devoted his attention to the construction of the road from Hoboken to Newark, which has now become an important link in the Morris and Essex Railroad.

The merger of the stock of the joint companies and the New Jersey Railroad was finally consummated in 1867.

This was the end of what was, perhaps, the most determined battle for railroad supremacy ever fought in this country. The contest was most bitter for years. The public prints were freely used as a medium for keeping the matter before the people — pamphlets were published and widely distributed by the partisans of both sides — William Cullen Bryant, in the New York *Evening Post*, taking an active part in the discussion.

By the act passed February 27, 1867, the joint companies, together with the New Jersey Railroad, were authorized "to "make such agreement for consolidation of interests as they "may deem proper and expedient," if, "ratified by two-thirds "in interest of the stockholders of each of said companies."

The articles of agreement by which the "United New Jersey "Railways and Canal Company" were organized was signed January 28, 1867, "to take effect as of the first day of January, "1867."

"portation Company, to construct a railroad or railroads in the State for "the transportation of passengers or merchandise between the cities of "New York and Philadelphia," and "that it shall not be lawful, before "the said first day of January, 1869, to construct any other railroad or "railroads in this State, without the consent of the said joint companies, "which shall be used for the transportation of passengers or merchandise "between the cities of New York and Philadelphia."

The names signed to the agreement were Ashbel Welch, Jos. P. Bradley, J. G. Stevens, C. Macalister, John Hulme, E. S. Sanford, for the D. and R. Canal and Camden and Amboy Railroad.

Hamilton Fish, Martin A. Howell, I. W. Scudder, A. L. Dennis, for the New Jersey Railroad and Transportation Co.

By the terms of the agreement each of these companies continued to maintain separate organizations, but all the directors of each company met in a joint board at stated intervals.

Profitable Local Business Developed.

The Camden and Amboy Railroad had a similar experience to all roads that had their termini in large cities — they were disappointed in the revenues from through business and agreeably surprised in the development of the local traffic. Settlements grew up rapidly along the line, and the cities through which the road passed became more populous. The development of the Pennsylvania coal lands created an enormous business for the canal, the tonnage in 1871 being over three million tons, and exceeding the amount transported that year through the Erie Canal. New Jersey became a manufacturing State, and the growth of manufactures there, as well as in the adjoining States, contributed materially to the enormous freight traffic that was increased yearly by the extension of southern and western connections.

Before the year 1850 the amount of westward tonnage on the railroad was more than double of that east bound, the large volume of coal being shipped to the seaboard by boat.

Coal Traffic Established by Railways.

Between 1855–60 coal was shipped by rail in large quantities, and South Amboy became a great shipping center of the anthracite business, and large piers and wharves, with shutes and other improved contrivances for handling coal, were built at that point.

Meager Terminal Facilities.

But the terminal facilities of the Camden and Amboy Company were so meager that the average cost of handling a ton

of freight at New York and Philadelphia was more in 1860 than the expense of transporting it on the road for a distance of two hundred miles.*

This immense cost, said the late Ashbel Welch, in a conversation with me in regard to these matters "led me to "invent and adopt barges so constructed that loaded wagons "could be driven on board, the freight not being handled "but once until unloaded at destination. These were put in "use between New York and South Amboy, and by this "means the terminal expenses were reduced so that it equalled "the expense of transportation for one hundred miles."

The Purchase of Harsimus Cove.

During the year 1866 arrangements were made for the purchase of Harsimus Cove, the price finally agreed upon being:

To the State of New Jersey, ...	$500,000
To other parties.	700,000
For 70 acres, ...	$1,200,000

This tract was afterwards increased in size. The acquisition of this valuable water front in New York harbor attracted the attention of the railroads with western connections, among them the Pennsylvania Railroad Company, who, in addition to their desire to reach New York, were also anxious to acquire a convenient outlet to their western connections.†

Lease to the Pennsylvania Railroad Company.

Negotiations between the Pennsylvania Railroad Company and the United Railroads which began in the latter part of 1869 were continued during the year 1870. The final terms were practically agreed upon in the spring of 1871. The lease of these works to the Pennsylvania Railroad Company was executed on June 30, and the property was formally transferred at midnight, between November 30 and December 1, 1871.

* At that time Pier No. 1, New York, and Walnut-street Wharf, Philadelphia, were the only freight stations owned by the company in these cities.

† The late Ashbel Welch stated to me that John Edgar Thomson, president of the Pennsylvania Railroad, informed him that the desire to come into possession of Harsimus Cove property was the direct cause that led the company to agree to the 10 per cent. clause in the lease of the United Companies.

CONCLUSION.

I have thus attempted to place upon record the circumstances connected with the birth and early history of the Camden and Amboy Railroad. The events that led to its origin are unique in railway history; its development in extent, power and influence were most remarkable.

Two of its founders, John and Robert L. Stevens, were men of national repute, who have left their impress for all time upon the systems of water and land steam transportation that have made this nation what it is. Many of the men connected with its management became prominent in the State and nation.

During the twenty years that have elapsed since the Camden and Amboy Railway became the Amboy Division of the Pennsylvania Railroad, the admirable system of track standards, in the introduction of which the Pennsylvania Company in America was the pioneer, has also been adopted on this road, and put into effect by the maintenance of way department. The great line from Philadelphia to Jersey City, via Trenton, has become one of the leading highways of America on account of excellence in construction and the safety, speed and comfort of its trains.

In another place* I have placed upon record many facts connected with the origin and early history of this great corporation, of whose success its officers and employes, present and past, have every reason to feel proud.

First opened for traffic in April, 1834, the growth of the Pennsylvania Railroad Company, especially of late years, has been remarkably rapid until now over 7,750 miles of railway are owned and leased or operated by its management.

Notwithstanding the fact that the first lines under its control were built through an exceedingly mountainous country; notwithstanding the fact that its general headquarters have the disadvantage of being located one hundred miles from the great financial and commercial center of the nation, it has established and still maintains a prestige which enables it to ob-

* The Semi-Centennial of the Pennsylvania Railroad Company, *Railroad Gazette*, April 11, 1884.

tain a large share of the traffic between the Atlantic seaboard, the Mississippi valley and the Pacific coast. To secure this measure of success has required able, energetic management and thorough organization in every department. Only by these means was it possible for "the Pennsylvania" to rise to a place among the greatest railroads of the world before the close of the first half century of the railway era.

Edgar Thomson, Scott, Roberts, Frank Thomson, Cassatt— are names that will forever be connected with the history of the development — I may almost say perfection — of the American railroad system of whose origin I have had occasion to speak to-day.

I believe it to be true that history perpetuated by things is more authentic, more valuable, than history recorded in words. Those who, with everlasting granite and enduring bronze, have marked this historic spot, around which cluster so many reminiscences of the introduction of steam transportation upon the Western Continent, have done an admirable work that will increase in importance as the years pass into decades, the decades into centuries. Verily, they have set an example worthy to be followed, and have proven that one corporation, at least, hath a soul!

The influence that the steam engine and the other epoch-making inventions have had upon the world's material progress were so fully set forth at the Patent Centennial Celebration, last April, that anything that I might add at this time would be trite indeed.

There is, however, a nobler era of national development which the railway has made possible. Other nations may possess as much wealth, exert as great power and enjoy as exalted a civilization as ours, but nowhere upon the face of the globe does mankind partake of the benefits of personal liberty to as great an extent as in free America. Without the railway and the telegraph (and without the railway there would have been no telegraph) this enviable condition could not have been reached.

Contemplate for a moment the circumstances existing previous to the foundation of the Union! In the South and West French and Spanish settlements had existed for hundreds of years — while the Dutch and English occupied our Eastern

U. S. NATIONAL MUSEUM.

shores, each nationality possessing peculiar traits of character inherited through centuries of contact with monarchical institutions. Among them were men of every sect and creed, Roman Catholics, Protestants and Quakers, each influenced by the most potent religious prejudices, and all bound by ties of kindred to the inhabitants of other shores — many owing allegiance to foreign kings. From these chaotic elements, and on the borders of a wilderness inhabited by savages, in a territory, a large portion of which was subject to the mal-influence of negro slavery, our forefathers, with a wisdom that seems almost superhuman, founded a Republic. But notwithstanding the attractions then offered by our free institutions to the oppressed of all lands, the nation — with roads that were impassable, with streams that were closed to navigation for months at a time — had a sluggish growth until the whistle of the steamboat echoed along the shores of the Father of Waters.

With the establishment of the iron highway connecting the Atlantic seaboard with the Ohio and Mississippi valley, then the lakes with the Gulf, and finally extending across the continent, how has the scene been changed ! !

The foreign tongue spoken by our ancestors of a few generations ago is seldom heard. Even the idioms and dialects peculiar to the natives of the East and South or West have almost disappeared. We have become one people — speaking one language, actuated by a common impulse "with malice toward none and charity for all."

Without the interchange of ideas and the intercommunication of our people, made possible by the railway, the ship of state could not have survived the storms through which it has passed ! Without the railway slavery would still be in existence in this free land ! ! Without the railway this grand Union of sixty-five millions of freemen would long ago have been divided into federations of petty States, each with a standing army, composed of the bone and sinew of the land, gnawing at the vitals of the State — retarding instead of aiding in industrial progress ! !

All hail to the Human Freedom League,* organized upon the 399th anniversary of the discovery of America, which, by

*The Human Freedom League was organized at Philadelphia, October 12, 1891. It has adopted a flag consisting of the stars and stripes placed between the tri-color of France and the flag of Switzerland.

the aid of the railroad, the telegraph and the newspaper, we have reason to hope will, long before our next centennial anniversary, secure liberty of thought and action to every member of the human race.

Could we lift the veil and peer into the future, we perchance might see steam superseded by that newer power, of which we know so little and expect so much ; another metal may take the place of that which has given the name to this the "Iron Age ;" perhaps, besides the great ships upon the waters and the huge locomotives upon the land, we may even see the winged aerodrome coursing the air in rapid flight ; all bringing to our descendants a higher civilization and greater possibilities for advancement than we are capable to conceive.

But upon the pages of the histories of the 19th century, to be read by the millions yet unborn, it will be recorded that the birth of the steamboat and locomotive was coeval with the establishment and first growth of this great Republic, and that by them were secured eternal Liberty ! Union ! ! Peace ! ! !

RESOLUTIONS

OF THE

BORDENTOWN CITY COUNCIL.

At a regular meeting of the Bordentown City Council, held Tuesday P. M., December 1, 1891, a committee was appointed to forward a fitting expression of thanks to the management of the Pennsylvania Railroad Company for the invitation extended them to be present at the dedication of the monument recently erected near Bordentown to commemorate the first movement of a train by steam power in the State of New Jersey.

Resolved, That we, the members of the Bordentown City Council, through this medium, tender our thanks to the officers of the Pennsylvania Railroad Company for their invitation to take part in the exercises on that day (Thursday, November 12, 1891), an occasion which, while it commemorates an event of peculiar importance in the railroad history of the country, has nevertheless its relative significance with those associated in the interests of the City of Bordentown, and the efforts of the railroad company to perpetuate the interest and insure the care of this memorable landmark will always be seconded with pride by the executive management of this city.

R. HARRY NEVIUS,
C. H. FENNIMORE,
J. BIRMINGHAM,
} *Committee.*

C. MENDENHALL, *President.*

E. P. FERRIS,
R. H. NEVIUS,
C. H. FENNIMORE,
P. BRAKELY,
J. BIRMINGHAM,
J. MAGEE,
P. BURNS,
F. FORD,
Members of Council.

PRELIMINARY SURVEYS FOR CAMDEN AND AMBOY RAILROAD.

Report of Major John Wilson, U. S. A., October 11, 1830.

To the President and Directors of the Camden and Amboy Railroad and Transportation Company.

Gentlemen:—Having been appointed by you in June last to make the necessary examinations and surveys, and to locate a line of railroad between Camden and South Amboy, and having organized two corps to carry into effect the objects contemplated by your Company, I now respectfully offer you a brief report in relation to our operations. In order to obtain a thorough knowledge of the country it was deemed expedient to conduct lines of levels over different routes between Camden and Amboy which appeared to offer favorable ground for the construction of a railroad. With this view, lines were simultaneously traced from the points of termination at Camden and Amboy towards Crosswick's creek.

The first route that was explored from Camden followed nearly the direction of the Mount Holly road to its interjection with the eastern branch of Pensaukin creek; the line was then conducted to the west of Moorestown, and crossed Rankocus creek below the mouth of Tallman's creek; whence it was traced to the east of Slabtown and the Black-Horse, crossing the Assiscunk creek above the mouth of Barker's branch, and pursuing a northerly direction it finally reached Crosswick's creek at a favorable position above Groveville for crossing that stream with a bridge. The explored line from South Amboy to the position at Crosswick's creek followed generally the turnpike to a point about three miles beyond Spotswood; it then diverged eastwardly and ascended through a favorable ravine leading to the summit of the plain which divides the waters of the Manalapin branch of South river from Cranberry brook, a tributary of Millstone river, it then pursued a straight direction to Hightstown; thence it followed the turnpike as far as Centerville, and again diverging from that road, it was then conducted, after uniting with the line from Camden at Crosswick's creek, to the Mile Hollow or ravine on the lands of Count de Surveillers; thence to the wharf at Bordentown.

From the knowledge thus obtained of the country between South Amboy and Bordentown, it was deemed inexpedient to prosecute any further survey for routes from Centerville towards Amboy, but rather advisable for the party under the direction of Lieutenant Cook to return to the latter place and take accurate cross levels of the ridges and spurs

between the waters of the Raritan river and Cheesequakes creek, so as to ascertain the best method of overcoming the abrupt ascent on that portion of the route. After a thorough examination of the country in every possible direction, and after surveying various trial lines at different inclinations, it was found that to obtain a graduated line, even at thirty or thirty-five feet to the mile, it would be at the expense of a circuitous route and great increase of distance. It was therefore finally decided by the Directors as most advantageous to consider the first one hundred and fifty chains of the line from the wharf at South Amboy as an inclined plane having a rise of one foot in one hundred feet. There being no other points on the route to Centerville which presented any serious obstacle to the location of a railroad, the party was accordingly directed to trace that much of the line until the further surveys between Crosswick's creek and Camden were completed.

The second route surveyed from Camden leaves the trace of the first line at a point west of Moorestown, and takes the direction of the Mount Holly road, which it crossed a short distance beyond the south branch of Rankocus creek. The line then kept east of the road, and after crossing the north branch of Rankocus creek and leaving Mount Holly immediately to the left, the survey was pursued to Jobstown. Thence to Georgetown; thence east of Recklesstown; thence to a point a short distance west of Shelltown; thence to Crosswick's, which it crossed below Waln's Mill. The line of the survey was also extended some distance beyond Crosswick's, in order to ascertain the features of the country in the neighborhood of Doctor's creek.

The third route surveyed from Camden to Crosswick's creek passed through Burlington; thence to the shore of the Delaware river, which it approached near the mouth of Craft's creek; thence along the shore of the river through White Hill to the wharf at Bordentown; thence over the marsh to the terrace below the Bellvidere (on the property of Count de Surveillers; thence along the face of the side hill bordering on the marsh of Crosswick's creek to the Mile Ravine, where the line branches. One branch was conducted along the side slope of the Mile Ravine, and after passing the Trenton road it was traced nearly in a direct line to Crosswick's creek, where it united with our former position above Groveville. The other branch, after crossing the Mile Ravine, was conducted to the side hill north of Mr. Pearson's house; thence along the side hill to a position near Middleton's house; thence over the meadows and Crosswick's creek to the bluff at the old landing. From the latter point the survey was continued to the neighborhood of Hightstown.

The face of the country over which the line was passed differed but little in its character from that before surveyed between Hightstown and the position above Groveville, both affording equal facilities for the formation of the main line of road.

As it was desirable that no route should be left unexplored from Bordentown eastward which offered any probability of superior advantages, another line was traced, passing through the ravine south of the

residence of the Count of Surveillers, and after crossing the Trenton and Amboy road it was conducted to the position above Groveville.

Having completed such preliminary surveys between Camden and South Amboy as appeared necessary to enable the Directors to form a judgment of the comparative advantages of the several routes which had been proposed for the main line of railroad, there was no hesitation on their part in selecting, in preference to any other, the *Western Route* passing through Burlington to Bordentown and thence towards Hightstown, crossing Crosswick's creek at the old landing below the turnpike. This latter route offered the shortest and easiest communication between the extreme points of the line, and at the least cost for construction. It also saved the necessity of a branch line, which must have been unavoidable had a more eastern route been adopted.

Description of the Located Line from South Amboy to Camden.

The line begins at the first bridge on the wharf at South Amboy, and after curving from the wharf is located nearly in a direct line to the front of the house at present occupied by Mr. S. Gordon; it then follows the gentle sloping ground west of that house for upwards of three-fourths of a mile; then curves around a projecting point of a sand ridge, and keeps upon the east side of a ravine leading to the first high ridge near the old Amboy road, which it passes over; thence gaining the opposite ravine the line is located for some distance nearly parallel with the Bordentown turnpike. Thence, turning with an easy curve to the left, it again keeps a direction parallel with the turnpike, and passes south of Buccleugh's house. Thence to the dividing ridge between the waters of the Raritan and South rivers; thence north of Bloodgood's house, and after curving through a ravine which opens to the turnpike, is located to the south of Brown's Tavern. Thence running nearly parallel, and a short distance south of the turnpike, it crosses in its course Tennant's creek, Deep run, South river, and enters Herbertsville in the rear of the tavern. Thence skirting the slope bank of South river until it passes Vanwinkle's residence, it again keeps parallel with the turnpike for some distance, and then crosses it at Melanaphy's house. Thence it takes a direction toward Spotswood, which it leaves to the east; passing which, it is then located to the north of Snowhill's snuff mill and near his mill-dam. Thence keeping north of the turnpike, passing Bowen's residence, and afterwards south of his snuff mill; then curving to the left, it recrosses the turnpike at Bennett's saw mill, and after having been located near to his residence, takes a southwest direction to the south slope of a ravine, through which the line is traced to the summit of a ridge dividing the waters of South river and Cranberry brook. This latter summit was attained with a high graduation and deep cutting. Thence the line is located in a straight direction through the lands of Gordon and Davison to the crossing place at Cranberry brook;

after which it continues in the same straight line through lands of ——— Holland and ——— Dye. Thence passing over the Millstone creek, and bending to the right through Applegate's land, it crosses the turnpike and Rocky brook about a quarter of a mile northwest of Hightstown. Thence in a straight direction through lands of Messrs. Cook, Britton and others, it reaches the turnpike at a point not far beyond Wild Cat swamp. Thence running on the north side of the turnpike and parallel with it, it crosses Bear run at Appleton's; and keeping still the same course, it is conducted to Centerville. From Centerville the located line keeps a straight direction, and after crossing the Assanpink creek north of Hutchinson's mill and east of Ford's house, it approaches the turnpike, which it follows, and after crossing Mirey run attains Hungry Hill summit between the Cross-keys Tavern and Tindale's house. From this summit the line keeps a straight direction, and passes west of Mrs. Pearson's house; thence after crossing ——— creek, it is located to the bluff at the old landing on Crosswick's creek. Thence crossing the creek and meadow, it is conducted along the side hill as far as Mr. Pearson's residence. Thence passing the lane leading from the Trenton to the Amboy road, the line is located to a ravine, which it follows beyond the Trenton road. Thence curving to the left and passing to the eastern slope of a high ridge, which separates it from Crosswick's creek on the property of Count de Surveillers, it then keeps along the face of this ridge, and, after crossing a deep run, reaches the shore of Crosswick's creek. Thence along the face of the steep bluff of the creek to the Mile Ravine; thence across Mile Ravine to the margin of the opposite side; thence along the face of the hill to the terrace below the Bellvidere; thence over the marsh to the steep side hill on land of Count de Surveillers, which it follows to the wharf at Bordentown.

I must here take occasion to remark that the line located from Crosswick's creek (at the old landing) to Bordentown was done by Lieutenant Crook, in accordance with the views of a majority of the Directors. It was deemed advisable by the Company that various lines of road should be explored through the lands of Count de Surveillers with a view not only to ascertain their cost of construction, but also that they might have it in their power to offer any of them to the Count for his selection. The two lines which were traced through his lands to the position above Groveville; the one passing through the ravine near Bordentown and the other through the Mile Ravine were both abandoned, the first being too expensive and the second rejected by the Count in consequence of the manner in which it passed through his property. It being considered by the Directors that the position at Crosswick's creek at the old landing below the turnpike offered a more favorable route for locating the railroad to Amboy than any other, on account of the distance being shorter; two other lines were located through the lands of Count de Surveillers, the one already described in the statement of the preliminary surveys as branching from the Mile Ravine in a direction to Mr. Pearson's house and thence to Crosswick's creek, and the other located in conformity with the

views of the Count, excepting that portion of it which is traced on the western slope hill of the table land nearest the Trenton road.

The profile of a part of the first of these lines exhibited a graduation of thirty-five feet in the mile ascending east for one and a quarter miles, but in making an estimate of its cost that grade was increased for the same distance to forty feet per mile. There can be no hesitation in deciding that of all the lines located from Bordentown to the old landing at Crosswick's creek, the latter possesses superior advantages, not only for its shortness of distance but also for the straightness of its direction.

Its cost of construction at a graduation of thirty-five feet, beginning at the terrace below the Bellvidere, or thirty feet from the wharf at Bordentown, is also less than the other lines. The Count, however, refused his consent to this line being established by the Company through his lands.

The next line located was more to the westward than the one already mentioned, and its excess of distance eight chains. It was located level from the wharf at Bordentown at four feet above high water (mean tide) for half a mile; it then ascended for about a mile further at a grade of forty feet per mile, in order to diminish the expense of excavating through the table land through which it passed at a mean depth of seven feet; thence descending at thirty feet in the mile to Crosswick's, it united with the line located from South Amboy about midway in the meadow bordering on the creek.

In comparing either of these lines with that described in the location of the Main Route as approved by the Directors, the superiority of the first is unquestionable; and placing the other two at an equal cost for construction by diminishing the grade of the one to thirty-five feet; the difference in distance being seven chains fifty links, places them nearly equal as regards the time that would be taken for the travel of a locomotive engine for one mile on their respective inclinations of thirty and thirty-five feet, provided the curves are alike in each location.* This is not, however, the case; a reference to the map (accompanying this report) will at once exhibit the difference in the respective curvatures of the two lines. As carriages are kept on the rails by flanges on the wheels, it is obvious that where there is on any portion of the line an excess of curvature the friction from rubbing on the sides of the rails, and consequent retardation, must be very great. On the whole distance from Amboy to Crosswick's creek, with the exception of a single instance, the location is remarkable for the great length of the straight lines, which must well adapt the route for rapid communication. From the above considerations I have been induced to dissent from the manner of location of that part of the line between Crosswick's creek and Bordentown. I would, however, recommend to the Company, when staking it out for the

* Assuming the velocity of a locomotive engine on an inclination of thirty feet per mile at ten miles per hour, the comparative velocity in traveling with the same weight on an inclination of thirty-five feet per mile will be as the difference between the space $\frac{1666}{100000}$ and $\frac{1538}{100000}$ of a mile per minute passed over. While, therefore, the engine has passed over one mile on an inclination of thirty-five feet, it would have traveled one mile, six chains and seventy-two links on an inclination of thirty feet; and in the case of forty feet graduation the difference would be thirteen chains forty-five links.

road formation, to straighten the line in those places which were curved for the purpose of obtaining earth for embankments, as the charter granted by the Legislature empowers the Directors to take materials for that purpose "on or near the said route."

From Bordentown the location of the main line is continued, after crossing Black's creek near its mouth, along the shore of the Delaware river to Craft's creek, which is passed near its junction with that river.* The line then leaves the river shore and follows the side hill of the creek; thence through lands of ——— English and ——— Kale, passing between the house and barn of the former, and curving to the left crosses Kale's run and approaches the Burlington road. Thence keeping the direction of that road towards Garwood's house; thence continuing between Garwood's house and barn on a side hill; and bending to the right, it passes a projecting point of hill; then curving to the left and passing through Smith's nursery, it follows the Burlington road near its edge for three-fourths of a mile. Thence across the Asisscunk creek on the lower side of the present causeway; thence through Broad street in Burlington on its western side and fourteen feet from the centre; thence crossing London run, and continuing to the west of I. Cox's dwelling house. Thence west of the Burlington and Camden road, passing near Cooperstown church, and crossing the former about a mile distant from Cooperstown. Thence to the Rankocus creek, which it crosses about thirty chains above the Toll Bridge; the length of the bridge over the creek being four hundred feet and the height above high tide twelve feet. From Rankocus creek the located line is traced to a position above the junction of the two branches of Laurel run; thence crossing the Moorestown and Toll Bridge road, it intersects Pompeston creek at the head of Haines' mill dam; thence to the Swede's Branch run, which it crosses near Worrington's house. Thence west of Lippincott's saw mill to the dividing ridge betwixt the waters of Pensaukin creek and Swede's run on property of I. Lippincott. Thence through the barnyard of I. Lippincott to the eastern branch of Pensaukin creek, crossing it near the tide dam; thence across a neck of land to the West branch, which is crossed below Poplar landing; thence through the Twenty-Mile valley on lands of Burrow, Lawrence and Clements; and through a depression in the ridge dividing the waters of Pensaukin creek and Baldwin's run on land of Merrit Horner, the line is conducted to the Cove Landing road. Thence in a parallel course with the Camden road, and turning a point of a ridge through Carter's land, it is traced to the Burlington road and Baldwin's run, both of which it crosses near Copperthwaite's store. Thence it follows the top of the side hill on Baldwin's run and pierces the dividing ridge between that run and Cooper's creek; thence through lands of ——— Cooper to Cooper's creek; thence over the creek below the present bridge on the Moorestown road;

* The level of the shore line of the route is about four feet above high water, mean tide. It would be advisable here in forming the road to place it between such portions of the side hill as are precipitous and the river, so as not to disturb the high and steep bluff.

thence crossing the Moorestown road, passes through land of ———— Carman to the Kaighn's Point road. Thence following the centre of Bridge street in Camden to the marsh bordering on the Delaware river.

The peculiar nature of the face of the country through which the line of the road is located rendered it necessary in many cases to use high numbers for its graduation. In some instances this might have been avoided by incurring the expense of deeper excavations and higher embankments, but as it was an object with the Company to diminish the cost of the road formation, and bring it within a less expenditure, it was considered by them expedient to adopt such graduations as they deemed best suited to the localities that presented themselves on the route. The table herewith submitted exhibits the graduation of the line as located from South Amboy to Camden.

[The tables which are omitted are in the files of the Section of Transportation and Engineering, U. S. National Museum.]

The map which accompanies this report is delineated by a scale of four inches to a mile. It would have been desirable to have exhibited on the drawing all the lines which have been explored during the course of the survey, but the shortness of the time which has been allotted to accomplish the work would not admit the extension of it for that purpose.* The map, therefore, only illustrated the survey of the located line as described in my report, in addition to which I have, in conformity with the charter of your Company, prepared two books containing the courses and distances of the located line, which are herewith presented. As the completion of the location of the line was only brought to a close a few days ago, we have also had but a short period of time to prepare the other documents illustrative of the operations we have been engaged in. It only remains for the completion of the duty assigned me to present the following approximate estimate † of the road formation :

*The Board of Directors, being anxious to commence the construction of the road at an early period, could not by the terms of their charter accomplish this until a return was made in the proper office of the whole location of the line. In order to fulfill my engagement with the Company, it was necessary that the documents should be completed for that purpose on the 11th of the present month ; the location was only finished on the 2d of the month.

† In the estimate of the cost of construction, the embankment in the Deep cut at South Amboy is put down at 12 cents per cubic yard and excavation at 15 cents. In the other portions of the road the cost of embankment varies from 7 to 14 and the cost of excavation from 6 to 11 cents per cubic yard.

The cost of the larger bridges are estimated as follows :

Over South river, 200 feet platform	$2,466 00
At Bennett's, 100 feet	750 00
Over Millstone creek, 60 feet	1,350 00
" Rocky brook, 60 feet	1,350 00
" Assapink creek, 60 feet	1,350 00
" Crosswick's creek	4,730 00
" Rankocus creek, 400 feet	5,783 00
" Pensaucon creek	
West branch, 110 feet	2,060 00
East " " "	1,960 00
" Cooper's creek, 800 feet	5,914 00

SUMMARY.

Section No.	1 = 160 chains (South Amboy)	$ 24,046	71
" "	2 = 160 "	17,519	88
" "	3 = 120 "	8,923	81
" "	4 = 180 "	6,462	10
" "	5 = 180 "	2,293	18
" "	6 = 160 "	1,865	75
" "	7 = 150 "	12,392	93
" "	8 = 130 "	7,805	35
" "	9 = 184 "	3,338	80
" "	10 = 160 "	4,883	36
" "	11 = 140 "	7,119	83
" "	12 = 164 "	2,247	94
" "	13 = 140 "	7,306	56
" "	14 = 160 "	5,644	85
" "	15 = 190 "	5,730	97
" "	16 = 174 "	21,070	74
" "	17 = 180 "	16,854	20
" "	18 = 290 "	24,216	00
" "	19 = 180 "	7,544	90
" "	20 = 140 "	3,176	16
" "	21 = 180 "	1,764	24
" "	22 = 164 "	2,981	06
" "	23 = 140 "	1,634	24
" "	24 = 140 "	14,045	34
" "	25 = 140 "	3,691	64
" "	26 = 180 "	3,437	28
" "	27 = 108 "	12,031	61
" "	28 = 120 "	2,547	86
" "	29 = 160 "	2,975	24
" "	30 = 196 " (Camden)	11,296	30
Grubbing on the whole line		4,250	00
Total cost		$251,101	83
Add for superintendence and unforeseen expenses 10 %		25,110	18
		$276,212	01

In closing my report on the location of the Camden and Amboy Railroad and my connection with the company, I would wish to do justice to the respective parties who conducted the surveys under the direction of Lieutenant Cook and Mr. J. E. Thomson. The alacrity and zeal with which they coöperated in bringing to a close the different duties assigned them has enabled me to fulfill my engagement with the Board of Directors.

All which is respectfully submitted.

JOHN WILSON,
Civil Engineer.

PHILADELPHIA, OCTOBER 11, 1830.

[Reprinted from the Railroad Gazette, April 11, 1884.]

THE SEMI-CENTENNIAL OF THE PENNSYLVANIA RAILROAD.

By J. Elfreth Watkins, C. E.

On the 15th of April, fifty years ago, the Governor of the State of Pennsylvania, the Canal Commissioners and members of the Legislature embarked on a canal boat from Harrisburg bound for Columbia to take part on the morrow in the formal opening of the railroad from Philadelphia to Columbia—the first link in the great chain of the present Pennsylvania system. That was the humble beginning of what has grown to be the giant corporation of the world, whose lines tap thirteen States — whose main tracks would extend from its eastern terminus, across the Atlantic through Europe, to the boundary of the Chinese Empire; or westward, across the continent and the Pacific, almost to Japan; whose second track, sidings, etc., alone would reach across the continent and over 1,000 miles into the Pacific — whose cars and engines made up in a single train would reach from the western boundary of Pennsylvania, across New Jersey, to the Atlantic ocean; to replace the timber under whose main tracks and sidings (allowing three cross-ties to the stump) would consume a double row of trees ten feet apart on each side of the Missouri from its source down the Mississippi to the Gulf — whose employés, if placed side by side, would form a rank reaching from Philadelphia to Trenton, and the iron and steel contained in whose tracks, bridges and cars, etc., would make a shaft six inches in diameter and long enough to extend from pole to pole upon which the world could turn.

This is the growth of half a century of the road, whose gross receipts average nearly $12,000 per hour — and whose net earnings would pay 2½ per cent. interest on the national debt.

It will be remembered that the Pennsylvania Railroad and Canal, from Philadelphia to Pittsburgh, was constructed and operated for about twenty-five years by the Commonwealth of Pennsylvania, remaining under the control of that State until 1857, when it was finally purchased by the present corporation.

The line from Philadelphia to Pittsburgh, as originally designed and constructed, was composed of

81.6 miles of railroad, from Philadelphia to Columbia;
172.0 miles of canal, Columbia to Holidaysburg;
36.7 miles of Portage Railroad, from Holidaysburg to Johnstown;
104.2 miles canal, from Johnstown to Pittsburgh;

394.5 miles in all.

Early History.

The industries of the State of Pennsylvania, which had, in common with the other Eastern States, slumbered during the war of 1812-15, began to revive soon after peace was declared, and the importance of better means of communication between the interior of the State and the seaboard became apparent.

As early as 1808 New York had taken the initiative steps by which that Commonwealth became the pioneer State of the Union in the construction of a great public work, the Legislature appointing a commission to consider the advisability of connecting the waters of the Hudson with those of Lake Erie.

At that time the railway for general purposes was an untried experiment in America, and in England only a few short colliery roads had been built. Nevertheless, the possibilities of the future had already dawned upon at least one American citizen, namely, John Stevens, of Hoboken, who opposed the construction of the Erie Canal and advocated a railroad, and, becoming involved in a discussion with the New York Commissioners, in 1812 published a pamphlet* containing his correspondence with them, in addition to a vigorous memorial which set forth "The advantages of a railway over canal communication." (About five years afterward Mr. Stevens memorialized the Legislature of New Jersey, advocating the construction of a railroad from New Brunswick to Trenton).

While there were some who believed that a railroad was practicable the vast majority regarded it as a wild and visionary scheme. Among the latter were the New York Commissioners, and work on the Erie Canal was formally commenced on the 4th of July, 1817, and the canal being completed and opened over its entire length of 363 miles, October, 1825. About the same time work on the "Union Canal" of Pennsylvania, which had been abandoned for several years, was renewed, this canal being completed and opened for use in 1824, and that of the Lehigh Navigation Company, from Easton to Mauch Chunk, shortly afterward.

Both of these canals did much to develop the trade in anthracite coal, which had been introduced only a short time before.

The advantages and disadvantages of a railroad had been discussed for some time by the press of Pennsylvania and in the Legislature at Harrisburg, but no decided step was taken until 1823, when the Pennsylvania Legislature passed "an Act to incorporate a company to erect a railroad from Philadelphia to Columbia in Lancaster County," (approved March 31, 1823), which recites that it was enacted in consequence of a memorial by John Stevens. This act constituted John Conolly, Michael Baker, Horace Binney, Stephen Girard, Samuel Humphreys, Emmor Bradley, Amos Ellmaker, John Barber and William Wright, "the Presi-

*This pamphlet, originally published by T. & J. Swords, New York, has recently been reprinted by the *Railroad Gazette*.

dent and directors of the Pennsylvania Railroad Company : it provided for the location of the route under certain restrictions ; it must not be more than forty feet wide ; must not pass through any burial ground nor church, nor through any house without the owner's consent, nor be located on any turnpike road ; must in no part of it rise above an angle of two degrees with the plane of the horizon ;" and it expressly directed that when it was completed transportation over it should be conducted under the superintendence of John Stevens. The company was authorized to charge seven cents per ton per mile on freight carried westward, and three and a-half cents on that carried eastward.

Although Messrs. Stevens, Girard, Binney, *et al.*, had succeeded in getting their act passed they received no tangible encouragement either from the State or from capitalists, although earnest efforts were made in that direction.

John Stevens, who as early as January 5, 1821, had written an open letter to Robert Wharton, Mayor of Philadelphia, in regard to the matter, was particularly zealous in his labors, but the citizens of Pennsylvania could not be aroused to the importance of the scheme. Their failure to encourage the undertaking led to the publication and distribution of a public letter by Mr. Stevens later, in 1823, which, considering the fact that no railroad for general purposes was in existence anywhere, is a fit supplement to the Stevens pamphlet of 1812, and entitles its author to be held in grateful remembrance by those for whose interests he labored so earnestly.

The following is a copy of it :

"PHILADELPHIA, 1823.

"SIR : It is now generally admitted that a railroad is not a mere visionary project, but is actually practicable. An erroneous idea has, however, prevailed among its opponents that it is only practicable to short distances, and that the contemplated extension of a railroad to a distance of seventy-three miles is ridiculous.

"As the railroad will, throughout its course, be in its construction exactly similar, it is only in its deviations from a horizontal line that any difference in the progressive motion of carriages thereon can take place. The charter contains a provision that the railroad in its progress shall in no part rise above an angle of two degrees with the plane of the horizon.

"Now let us suppose that a section of the intended railroad be constructed in the immediate vicinity of the city, of one mile in extent, in the progress of which elevations of two degrees do actually occur. Should it, however, be practicable on such section of the intended railroad to cause loaded carriages to move forward and backward, without encountering any impediment or difficulty, would it not be fairly presumable that the effect would be precisely the same were a similar road to be extended ever so far? Such an experiment, then, would not fail to produce conviction in the minds of the most incredulous.

"As a further illustration of the practicability of the proposed railroad, it would be barely necessary to notice the rapid progress this important improvement has recently made in the Island of Great Britain. If in the narrow limits of twenty-one miles in length and twelve miles in breadth, in the immediate vicinity of Newcastle, no less than 450 miles of railroad have within a very short period of time been formed, why

should it not be practicable to erect one extending only seventy-three miles? The contemplated formation of a railroad from Manchester to Liverpool, between which large towns there now exists a spacious canal, demonstrates very forcibly its feasibility and great utility.

"The expense of the contemplated railroad is estimated at about $5,000 per mile. One thousand shares, then, at five dollars each, would be sufficient for the construction of one mile of the road.

"An appeal is now therefore made to the enlightened patriotism and to the enterprising spirit of the good citizens of Philadelphia to step forward, and, by an advance of five dollars each, to place the contemplated improvement beyond all possibility of doubt or uncertainty.

"That the stock will, from the start, yield more than legal interest, there cannot be a shadow of a doubt. That it will ultimately, and at no distant period, yield 12 per cent. per annum is equally certain.

"The contemplated railroad will differ from turnpike roads in these very important particulars: The actual expense of transportation on the railroad will be reduced to one-quarter to what it now is on the existing turnpikes. But the most essential point of difference, as it regards stockholders, is that the whole of the emoluments to be derived from the transportation of commodities, and from the conveyance of passengers, will go to the railroad company, whereas the turnpike company receives only a toll. The expense of repairs will bear no proportion to that incurred on turnpike roads. The railroad, too, will be equally good at all seasons of the year. This circumstance gives to a railroad a decided superiority also over a canal, which continues for months, during the winter season, locked up by frost.

"But when, in the progress of improvement, the power of steam shall be substituted for that of horses, transportation will most assuredly be afforded at much less than on a canal. However extraordinary this opinion may appear, by a recurrence to calculation it is, nevertheless, capable of demonstrative proof. And when this great improvement in transportation shall have been extended to Pittsburgh, and thence into the heart of the extensive and fertile State of Ohio, and also to the great western lakes, Philadelphia may then become the grand emporium of the western country.

"Should the subscription for the shares be speedily filled, the road from Philadelphia to Columbia may with ease be finished before the next winter, and thus the stockholders will derive an immediate interest on their stock.

"I am, sir, your obedient servant,

"JOHN STEVENS."

No comment is needed upon this remarkable paper, which is a fitting supplement to the pamphlet issued eleven years before.

Colonel Stevens' efforts in this direction shared the same fate in Pennsylvania as in New York, and although he made diligent efforts to excite popular opinion in favor of his project during 1824 and 1825, he was unable to raise funds even to build one single mile of road as an experiment, although only $5,000 were required. The Legislature of 1826 repealed the charter, although the seed then sown was to bring forth good fruit.

Had Colonel Stevens been able to carry out his plans the Pennsylvania Railroad would have been the pioneer railroad on this side of the Atlantic.

The success of canals abroad and of the Erie Canal, a portion of which was then in operation, led the Legislature to pass an act on the 27th of March, 1824, "Providing for the appointment of a Board of Commissioners for the purpose of promoting the internal improvement of the State."

This Commission met with the same difficulty in obtaining the services of a competent engineer as was afterward experienced by the Baltimore and Ohio and other railroads, for at a subsequent meeting in May the president reported to the board, "That he had made most diligent search and anxious inquiry after an engineer," without success. The work was, however, carried on without a "competent engineer," the board in one of their subsequent reports stating, "We have found by observation and experience that purchasing the proper instruments, and encouraging active men who have some general acquaintance with science to use them, is the most effectual method for the State to get a proper corps of civil engineers."

On the 11th of April, 1825, an act was passed repealing former acts and providing for the appointment of five Canal Commissioners, "to consider and adopt such measures as they shall think requisite and proper, preparatory to the establishment of a navigable communication between the eastern and the western waters of the State and Lake Erie," and several routes of all *water* communication were surveyed.

The discussion between the advocates of the railroad and canal in Pennsylvania continued, and the general subject of intercommunication became to be regarded of such importance that "The Pennsylvania Society for the Promotion of Internal Improvement" was organized in November, 1824, with a membership of forty-eight public-minded citizens, who paid an initiation fee of $100 and annual dues of $10 each. Among the objects for which the society was organized was "To open an entire and complete communication from the Susquehanna to the Allegheny and Ohio rivers, and from the Allegheny to Lake Erie."

The society, impressed with the importance of the subject, went actively to work, and at a meeting held on the 19th of January, 1825, decided to "send an agent to Europe to collect information of all the valuable improvements in canals, roads, railways, bridges and all other information calculated to promote the objects of the society."

At a meeting of the society held February 3, 1825, William Strickland, of Philadelphia, with Samuel Kneass (his pupil) were assigned by the society to the important mission, and on the 20th of the following month they sailed.

In addition the attention of the society was directed to the publication of papers showing the usefulness of canals and railroads. These labors were immediately successful—their papers were read with interest—and through the efforts of Gerard Ralston, their corresponding secretary, the attention of distinguished men in all parts of the East was called to the importance of a liberal and extended encouragement of public works.

On the 16th of June Mr. Strickland completed his first report on railways and locomotive engines, and forwarded it. This report was followed on the 28th of July by a report on canals, and on the 3d of August by a paper on turnpikes.

As Mr. Strickland's reports were published and widely read by those interested, their influence upon the minds of those who were about to engage in canal and railroad construction cannot be estimated.

The battle between the friends of the railroad and the canal was waged with much earnestness during the early part of Mr. Strickland's absence, as the following extract from the correspondence between the Pennsylvania Society for Internal Improvement and its agents will show.

"Extract from a letter addressed to William Strickland, Esq., on September 19, 1825:

"*Canals and railways* present the most important of all subjects for your attention. Upon every matter connected with both you will be expected to be well informed; and if you shall have to decide between them you must be able to furnish the facts and circumstances by which the decision shall be produced. Much excitement prevails in this State upon the question whether railways are superior to canals, and the inquiries that are in progress in relation to them are in the hands of men of ingenuity and well disposed to the cause of internal improvement. It is, however, feared by many that the question between canals and railways will have an injurious influence in Pennsylvania, as it will divide the friends of the cause of improvement, and thus postpone, if not prevent, the commencement of the work. The importance of correct information in relation to them is thus greatly increased."

Mr. Strickland shortly afterward returned to Philadelphia, and in 1826 his "Reports," profusely illustrated by large and handsome plates, were issued. In March, 1826, he was appointed Engineer of the proposed canal from Middletown to Holidaysburg, and he prepared a general map and estimate of its cost. Ground was broken for it July 4, 1826, and the work was soon put under contract. Previously the project of connecting this canal by a railroad with the Delaware river had not been thought feasible; and in the spring of 1827 surveys were completed for a canal, which was put under contract October 13 of that year, and work was begun at Bristol and Easton. De Witt Clinton, Jr., of New York, was appointed engineer of the Western or Juniata section, and Major John Wilson, who had been an officer of the Corps of Topographical Engineers, U. S. A., and "Chief Civil and Military Engineer of the State of South Carolina," was assigned to the surveys between the Delaware and the Susquehanna. He made careful surveys, beginning at Valley Forge on the Schuylkill, nineteen miles above Philadelphia, through the Chester Valley, Downingtown and Coatesville to the gap at the summit of Mine Ridge. Having decided that this route was impracticable for a canal, in accordance with his instructions he began to make surveys and estimates for a railroad from Philadelphia through Chester and Lancaster counties to connect with the Eastern Division of the Pennsylvania Canal. These were completed November 29, and he presented his reports to the

board December 17, 1827, and an approximate estimate January 12, following.

March 24, 1828, just five years after John Stevens had succeeded in getting his act passed, the Legislature passed an act "to provide for the commencement of a railroad" to be built by the State, and in April Major Wilson began the location of the Philadelphia and Columbia Railroad, with a corps of twelve men,* at Columbia. A report on the twenty-nine miles from Columbia to the summit of Mine Ridge was made August 15, and one on the remainder of the line December 1. In April, 1829, the work was put under contract.

The Philadelphia and Columbia Railroad.

The eastern terminus of this road was at the corner of Broad and Vine streets in the city of Philadelphia, whence the road extended in a straight line to Callowhill street; here the road curved to the northwest and passed on to the old "Pratt's Garden," where it entered a cut seventy feet deep, excavated for a canal in 1792, and afterward abandoned; the line then followed the bed of this old canal slightly altered, and crossed the Schuylkill river below Peter's Island on a wooden bridge 1,045 feet long, seven spans, the abutments and piers of solid masonry.

On the west bank of the river was the foot of an inclined plane 2,805 feet long, rising 187 feet straight and uniform in grade; the line then continued up the dividing ridge for some distance, thence descending into the valley of Chester county and through Downingtown and Coatesville to Lancaster, thence to the head of the inclined plane at Columbia, descending ninety feet in a length of 1,720, thence along the Susquehanna to the basin at the termination of the Pennsylvania Canal, the total length of the road being 81.6 miles.

There are thirty-one viaducts and seventy-three stone culverts on the line.

The contract for bridging and grading forty miles of the road (twenty miles at each end) was given out in April, 1829, and by January 1, 1830, a large portion of the work was completed. The Legislature of 1829–30 made no appropriation for the further prosecution of the work, and during 1830 everything came to a standstill except the completion of what remained unfinished of the contract given out. This condition of affairs continued until March, 1831, when a large appropriation was made by the State, and the work was resumed, the contracts being awarded in May for grading and bridging the remaining forty-one miles. Track-laying was proceeded with as fast as the grading was ready.

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*There were some men who afterward became eminent in this corps, which were: Joshua Scott, principal assistant; Robert Pettit and John Edgar Thompson, assistant engineers; John P. Baily, Samuel W. Mifflin, Wm. Hasell Wilson, J. Brinton Moore, rod-men; Wm. J. Lewis, Wm. W. Torbert, John G. Davis and James Moore, chainmen.

Superstructure.

The combination of the strap-iron rail and granite stringer in use on the Baltimore and Ohio Railroad, and which was thought to possess great merit, was adopted at first for a few miles by the engineers of the Philadelphia and Columbia road.

About six miles of track were laid with it before its demerits were fully understood. The strap-iron rail two and one-half inches by five-eighths of an inch was, however, placed nearer the middle of the stringer than on the Baltimore and Ohio.

The stone stringers were from three to twelve feet long, twelve inches deep and twelve inches wide, and rested upon a layer of broken stone laid in a longitudinal trench two feet wide and cut ten inches below the bottom of the sill. The spikes which held the rail were driven into locust plugs, which were put in holes five-eighths of an inch in diameter and three and one-half inches deep. The bars were fifteen feet long, and a horse-path of gravel and broken stones six inches deep was made between the tracks.

On the remainder of the line rolled "edge rails" were adopted. They were in lengths of fifteen feet, being three and one-half inches high, and weighed about forty-one and one-quarter pounds to the yard, costing $50.50 per ton delivered at Philadelphia. The chairs weighed fifteen pounds each, and each wedge about ten ounces. All the track material was imported from England, where it cost £6 17s. 6d. per ton. These chairs were either supported by stone blocks twenty inches by twelve inches or twelve inches, or stone stringers twelve inches deep, or upon wooden cross-ties laid on longitudinal sleepers.

The length of the single track, exclusive of sidings and crossings, was 163.2 miles, of which six miles were laid with granite sills plated with strap-iron; eighteen miles with wooden stringers similarly plated; and the remainder was stone blocks and edge rails, having cross-ties at intervals of fifteen feet. On two miles the cross-ties were of stone and on the remaining distance of wood.

Different portions of the road were operated as fast as built for construction purposes. On the 20th of September, 1832, a single track about twenty miles long, from the head of the incline plane on the Schuylkill to the junction of the West Chester Railroad beyond Paoli, was opened for travel. The whole road from Philadelphia to Columbia was formally opened in the presence of the Governor and members of the Legislature April 16, 1834.

Early Locomotives.

Although the original design in making horse-paths was generally carried out, in 1832 Col. Stephen H. Long of the U. S. Topographical Engineers, who, in March, 1830, had been appointed by the Board of

Canal Commissioners to make a survey and examination of the different routes for crossing the Allegheny Mountains, having concluded his labors in that direction, was residing in Philadelphia, and became interested in experiments with locomotives, William Norris being associated with him.

In 1833 they constructed the first engine that ran on the road. It was called the "Green Hawk," and from what can be learned was not very successful. Their second engine, the "Black Hawk," was some improvement over the first, and they then constructed the third, which had no name, but was dubbed by the workmen the "Tomahawk."

These engines were frequently experimented with near the eastern terminus of the road. They were regarded as great curiosities, and invitations to accompany the inventors on the trial trips were eagerly accepted; but as it had been decided at that time to use horse-power on the road, no locomotives were purchased by the State previous to 1834.

Messrs. Long and Norris afterward established a locomotive manufactory at Bush Hill, and built engines for several of the roads in the neighborhood. Shortly after the road was opened, Mr. Baldwin's success with the "Ironsides" on the Germantown road, and the "Miller," built for the Charleston and Hamburg road of South Carolina, led the Commissioners to order a locomotive, and in June 1834 the "Lancaster," weighing 17,000 pounds and having six wheels, was completed and delivered to the road for service. This was the first engine that went into regular service on the Pennsylvania Railroad.

The *American Railroad Journal* of March 21, 1835, speaking of this engine, says:

"The passenger cars on the Columbia Railroad are propelled by a locomotive engine. The trip from Philadelphia to Columbia, eighty-two miles, is made in about six hours, and it is believed that it will soon be made in four hours."

The experiments with this engine were so gratifying to the State Board of Commissioners that they decided to use steam locomotives, and by June 1, 1835, nine engines were at work on the road.

The following is from the *American Railroad Journal* of June 20, 1835:

"There are seven of these Baldwin engines at work on the Pennsylvania State Road, on which they also have two English engines from the workshop of the most celebrated maker, R. Stephenson. The engineer who had charge of the locomotive department on this road informs me that the power of the American engines is 35 per cent. greater than that of the English.

"The Pennsylvania Road is almost a continuous series of curves, varying from 500* to 700 feet radius, and so severe is it upon the wheels of an engine that one of the English engines, the other having been out of repair most of the time, has, within two months, used up a part of the wheels on both engines."

* The minimum radius of curvature when the road was constructed (for horse cars) was 631 feet.

By the end of the year 1835 the company had purchased seventeen locomotives, four of which were constructed in England by Stephenson & Co.

When the road was first opened it was operated as a public highway. Individuals and transporting firms owned the horses and cars. The latter were made of every conceivable size and shape, their capacity being from three to four tons. The drivers were rough fellows, and often gave great trouble through their stubbornness. No time-tables were then in force, and while only a single track of the road was being operated they often gave much annoyance.

The right of way was determined by the following rule: Half-way between the turnouts, which were one and one-half miles apart, a large post (called the center post) was set up, and when the drivers on single track met between turnouts, the one who had passed the center post had the right to go on and the other was compelled to go back.

As the road was so crooked that the drivers could not see far ahead, each would drive slowly after leaving the turnout, for fear he might have to be turned back. As he approached the center post he accelerated his speed, hoping to get beyond it before his rival reached it. Many exciting races and not a few accidents resulted from the eagerness of these drivers to gain their point. Soon after the road was opened it became evident to the managers that in order to operate the road successfully it was desirable that the State should own all the motive power. This was bitterly opposed by those living along the line of railroad, on the ground that, as the people were taxed to build and maintain the railroad, the farmers along the line should have the right to drive their own horses and cars to and from the Philadelphia market, the same as on the turnpike. Among those that took this ground was the late Thaddeus Stevens, who was the leader of his party at that time in the Legislature. After considerable opposition a bill was finally passed, and it was decided that the motive power should all be owned and managed by the State.

The following is condensed from an article descriptive of the Philadelphia and Columbia Railroad, written for the *Journal of the Franklin Institute* of May, 1840, by W. Hasell Wilson, now Consulting Engineer of the Pennsylvania Railroad:

"The rates of toll for the use of road vary from six mills to four cents per ton (of 2,000 pounds) per mile. There are twelve different rates, the average of which would be two cents per ton per mile. The lowest rates are for coal, stone, iron ore, vegetables, lime, manure and timber, and the highest are for dry goods, drugs, medicines, steel and furs.

"On the United States mail the toll is one mill per mile for every ten pounds. On every passenger, one cent per mile. In addition to these rates a toll is levied of one cent per mile on each burthen car, two cents per mile on each baggage car, and on every passenger car one cent per mile for each pair of wheels.

"The motive power toll is: for each car having four wheels, one cent per mile; for each additional pair of wheels, five mills; for each passenger, one cent per mile, and for all other kinds of loading twelve mills per ton (of 2,000 pounds). The owners of cars now charge $3.25 for every

passenger, and $7.50 for every ton of merchandise conveyed the whole length of the road, they paying all tolls, which is at the rate of four cents per mile for passengers, and 9.14 cents per mile for a ton of goods. Taking the length of the road at eighty-two miles, the average number of passengers to an eight-wheel car at thirty, and the load of a four-wheel burthen car at three tons, we have the following results :

"Road toll on an eight-wheel car, four cents per mile.
Road toll on thirty passengers, thirty cents per mile.
Motive power toll on car, two cents per mile.
Motive power toll on thirty passengers, thirty cents per mile.
Total toll for thirty passengers, sixty-six cents per mile, or two and two-tenths cents per mile for each passenger, leaving one and eight-tenths cents per mile to the owners of the car for every passenger.
Road toll on a four-wheel burthen car, one cent per mile.
Road toll on three tons of dry goods, twelve cents per mile.
Motive power toll on car, one cent per mile.
Motive power toll on three tons of dry goods, three and six-tenths cents per mile.
Total toll on three tons of dry goods, seventeen and six-tenths cents per mile, or 5.86 cents per mile per ton to the owner of the car.

At that time the—
Superintendent of motive power received $4 per day.
Agents for passenger trains (now called conductors), $2 per day.
Agents for burthen trains (now called conductors), $1.50 per day.
Conductors of State cars, $1.25 per day.
Master machinist, $4 per day.
Foreman of workshops, $2 per day.
Signalmen and assistants, $1.25 per day.
Engineers of locomotives, $2 per day.
Firemen of locomotives, $1.25 per day."

The Philadelphia and Columbia Railroad suffered the same inconvenience as the other railroads of the early times from the difficulty of obtaining competent mechanics to repair their locomotives and capable engineers to run them. Men who understood the construction of the locomotive and its working were in great demand, and were permitted to do pretty much as they pleased. They started when they were ready, ran at whatever speed they wanted to, and managed the train as they desired. They were masters of the situation and were a law unto themselves. This condition of affairs became so unsatisfactory to the patrons of the road that a committee was appointed by the Legislature "to examine into and report upon the present state of the motive power of the Philadelphia and Columbia Railroad." The report which it made shows a frightful lack of order and system in the working of the road.

The Allegheny Portage Railroad, by which the canal between Columbia and Holidaysburg was connected with the canal west of the mountains, which completed the line to Pittsburgh, was begun in 1831, and opened for traffic March 18, 1834. It was thirty-six and two-thirds miles long, from Holidaysburg to Johnstown. Sylvester Welch, brother of the late Ashbel Welch, was chief engineer. From Johnstown to the summit, 26.59 miles, the ascent was 1,172 feet; from Holidaysburg to the summit, 10.1 miles, it was 1,399 feet. There were five incline planes on each side

U.S. NATIONAL MUSEUM

of the summit. A tunnel 901 feet long, near Johnstown, was the first railroad tunnel built in America. During the first winter the working of the road was suspended after the canals were closed. During 1835 more than 50,000 tons of freight and 20,000 passengers were carried over the road.

The rails on this road, imported from England at a cost of $48.05 per ton in Philadelphia, weighed forty pounds per yard.

They rested in cast-iron chairs, weighing thirteen pounds each, which were fastened to stone blocks of about three and one-half cubic feet, each placed three feet from center to center and imbedded in broken stone. On the inclined planes, and on some other parts of the road, flat rails were used on longitudinal timbers. The stationary engines at the top of each plane were of thirty-five horse-power, and raised and lowered trains of four cars with a net load of 7,000 pounds, which they were able to do from six to ten times an hour. On the long level of thirteen miles four locomotives were used. Up to January 1, 1836, the road had cost about $1,700,000.

The Western Division of the canal was opened as early as 1830.

The entire line from Philadelphia to Pittsburgh, when first opened, was composed as follows:

	Miles.	Cost.
Philadelphia and Columbia Railroad	81.6	$5,277,278
Eastern Division Canal	172.0	5,313,251
Portage Railroad	36.7	1,860,753
Western Division Canal	105.0	3,173,432
	395.3	$15,624,714

This line was the predecessor, rather than the beginning, of the Pennsylvania Railroad as it exists to-day between Philadelphia and Pittsburgh, only the Philadelphia and Columbia Railroad, and that greatly modified in location, forming a part of the present road, which, however, follows the line of the canal for a considerable distance. It is interesting to note that the present railroad, only 354 miles between Philadelphia and Pittsburgh, taking the place of the pioneer route that cost $15,624,714, earned during the year of 1883 no less than $26,720,293 gross and $12,318,055 net—thus magnificently justifying the high hopes of the pioneers who planned the route before the locomotive had demonstrated its efficiency to the world.

THE NEW JERSEY RAILROAD AND TRANSPORTATION COMPANY.

[From Gordon's Gazetteer of New Jersey, 1834.]

The New Jersey Railroad and Transportation Company was incorporated by the act of 7th March, 1832, with a capital of $750,000, and the privilege to double it, divided into shares of $50 each; with power to make a railroad not more than 66 feet wide, with as many tracks as they may deem proper, from such point in the city of New Brunswick, as shall be agreed upon by them and the corporation of that city, through or near the villages of Rahway and Woodbridge, within half a mile of the market house, in Elizabethtown, and through Newark, by the most practicable route, and thence contiguous to, or south of the bridges over the Hackensack and Passiac rivers; crossing Bergen Ridge, south of the turnpike road to some convenient point not less than 50 feet from high-water mark, on the Hudson river, opposite to the city of New York; and to make a branch road to any ferry on the Hudson opposite to New York, which shall join the main road within 100 yards of the Hackensack river, if the main road cross that river within 100 yards of the present bridge; but if more than 100 yards from that bridge, then the branch to join it at such point, west of the river, as shall best give to the ferries equal facilities of communication with Newark. And if the company do not construct such branch as soon as the main road from Newark to the Hudson shall be made, then the law authorizes the owner of the ferry so to do, with the same power and liabilities as the company. The act also empowers the company to regulate the time and manner of transporting goods and passengers, the description and formation of carriages, and the rates and modes of collecting toll within the following limits: viz., for empty carriages weighing less than a ton, two cents; more than one and less than two tons, four cents; above three tons, eight cents per mile; and, in addition thereto, six cents per ton for goods and three cents for each passenger per mile: Provided, that no farmer of the State shall pay toll for carrying the produce of his farm, in his own wagon, not weighing more than a ton, when such produce does not weigh more than 1,000 lbs., but shall pay only for carriages, as if empty. It also authorizes the company to construct branches to any landing on or near the Passaic, not north of Belleville, and to any place in the township of Newark; and requires them to commence the road at Jersey City and New Brunswick within one year and to complete the whole route in five years, under penalty of forfeiture of their charter. The company are further empowered to purchase any turnpike road and bridges on the route; but the act reserves to the State and individual stockholders of the Newark Turnpike Company the right, at any time within two years from the opening of the books, to take stock of the company in exchange, or to sell to the company, at market value; but the Newark turnpike and the bridges over the Raritan, Passaic and Hackensack are to be kept as public roads, without obstruction; to build or purchase carriages for the transportation of persons or property; but not to charge more than six cents a mile for transporting passengers and each ton of goods, nor more than $1.25 for carrying passengers from New York to New Brunswick; to hold real estate at the commencement and termination of their roads not exceeding three acres at each place; and to build

thereon warehouses, stables, machine shops, etc., and over the Hackensack and Passaic rivers such bridges, piers, etc., as may be necessary. The State has reserved the right to purchase the road after the expiration of the charter (30 years) and of subscribing one-fourth of the stock, and has imposed an annual tax of ¼ per cent. upon the capital paid in; and should the road be continued across the State, a transit duty of eight cents for each passenger and 12 cents for every ton of goods transported over the whole road. By a supplement to the act relative to the Delaware and Raritan Canal and Amboy Railroad, the companies are required to construct a lateral railroad from the village of Spottswood to the city of New Brunswick, as soon as a railroad shall be made from New Brunswick to the Hudson river; consequently, when the Camden and Amboy Railroad and the New Jersey Railroad shall be completed, there must be a railroad through the State from Jersey City to Philadelphia.

The New Jersey Railroad Company commenced operations in the summer of 1832, and have confident expectations of completing the road from Hackensack river through Newark to Elizabethtown, by the fall of 1833; and from the Hudson to Elizabethtown in the summer of 1834; and the whole line, from the Hudson to New Brunswick, within two years. The estimated cost of the whole road for one track, with suitable passing places, including the purchase from the Bridge and Newark Turnpike Companies, the bridges over the Hackensack, Passaic and Raritan, and the moving power, cars, etc., as per report of N. Beach, the engineer, is..... $718,912

Cost of superstructure for a second track on the whole line, 30 miles, at $4,710.80 per mile..... 141,324

Total..... $860,236

Upon this capital the company, after paying for annual repairs, cost of moving power, cars, etc., the sum of $35,640 per annum, anticipate to receive a profit of $134,775, equal to 15½ per cent.

By an arrangement with the Patterson Railroad Company, the road for both companies, from the west side of Bergen Ridge through the Deep Cut, and across the heavy embankments, on the east of the Ridge and to the Hudson river, is to be constructed under the charter of this company as joint property of the two companies, the Patterson company paying two-fifths and this company three-fifths of the expense of construction, each company using the road without accounting to the other. This arrangement reduces the expense of the New Jersey Company $55,171.

The company, in order to avoid litigation, has purchased of the United Passaic and Hackensack Bridge Companies their stock at $150,000, equal to $150 per share, upon which amount it had for some years paid seven per cent. and created a surplus fund of $30,000. With this stock they obtained also all the right which the bridge company possessed to pass the Passaic and Hackensack rivers, by bridges, for sixty years to come. A very large majority of the stockholders of the bridge companies used the right of election stipulated for, to take railroad stock, and have thus become identified in interest with the company.

THE PHILADELPHIA AND TRENTON RAILROAD COMPANY.

The Legislature of Pennsylvania, by act approved February 23, 1832, empowered the Philadelphia and Trenton Railroad Company, as soon as they can conveniently, to locate and construct a railroad of one or more tracks from a suitable point in the district of Kensington (Philadelphia) through the borough of Frankford, intersecting the Delaware Division of the Pennsylvania Canal in the borough of Bristol, and continuing to a point at or near the Trenton-Delaware bridge, in the borough of Morrisville, and to make, construct and erect such warehouses, toll-houses, carriages, cars, and all other works and appendages necessary for the convenience of the said company in the use of the said railroad: *Provided*, that the said company shall not be allowed to construct said railroad until the board of canal commissioners of Pennsylvania shall examine the location and be of opinion that the route of the said railroad will not interfere with the most eligible route for a canal from Bristol to the city of Philadelphia: *Provided*, That the said company shall not be allowed to locate said railroad on any turnpike road or public street now constructed or laid out, to a greater extent than may be necessary in crossing the same, or to enable the said railroad to be carried to the Trenton-Delaware bridge, and shall be compelled to take the north side of the Bristol turnpike road if the ground is preferable: *Provided also*, That the said company shall not be allowed to approach within three hundred feet of said bridge with any locomotive or other steam-engine, without the consent of the said bridge company thereto. (Sec. 8.)

That the said railroad shall be constructed by the said company as not to obstruct or impede the free use and passage of any public road or roads which may cross or enter at the same, being now laid out or hereafter to be laid out; and in all places where the said railroad may cross, or in any way interfere with any public road, it shall be the duty of the said company to make or cause to be made, a good and sufficient bridge, causeway or causeways, to enable all persons passing or traveling such public road to cross and pass over or under the said railway, which bridge, causeway or causeways shall be made and maintained by the said company; and if the said company shall refuse or neglect to make such bridge, causeway or causeways, or, when made, to keep the same in good repair, they shall be liable to pay a penalty of ten dollars for every day the same shall be neglected or refused to be made or repaired, to be recovered by the supervisor of the township, or the officers of any incorporated company, with costs, for the use of the township or company, as debts of like amount are by law recoverable, and shall, moreover, be liable to an action or actions at the suit of any person who may be aggrieved thereby, and the service of process upon any officer or agent of said company shall be as good and available in law as if served upon the

president thereof: *Provided*, That no obstruction whatever shall be placed on or across any stream, now declared a public highway, so as to impede or interfere with the full and free navigation thereof, or to change the direction of any stream or water-course, not declared a public highway, so as to affect the rights and interests of the owners thereof, without the consent of the said owners, unless the right to the same be obtained by such process as is before directed in relation to other private property; and that any inconvenience or expense attending the alteration of vessels now navigating said streams to conform to the bridges erected by said company shall be paid out of the funds of the company. (Sec. 11.)

That on the completion of the said railroad, or any portion thereof, not less than ten miles, the same shall be esteemed a public highway for the conveyance of passengers and transportation of merchandise and commodities, under such regulations as shall be prescribed by the directors; and it shall and may be lawful for the said company to demand and receive such sum or sums of money for tolls, of persons and property, as they shall from time to time think reasonable: *Provided*, That the toll on any species of property shall not exceed five cents per ton per mile, nor upon passengers more than three cents each per mile; and it shall be further lawful for the president and directors of the said company to prescribe the kind of carriages, wagons, and conveyances which shall be used on the said railroad for the transportation of persons and commodities, and to adopt such regulations as to the transit of wagons and carriages on the said road as may seem to them most conducive to the interests of the public and of persons using the same. (Sec. 13.)

That the president and directors shall have full power to purchase with the funds of the said company, and place on the said railroad, all machines, wagons, vehicles, carriages, and teams of any kind whatsoever, which they may deem necessary and proper for the purposes of transportation; and that they may also, to any extent which they may deem advisable, transport all goods, wares, minerals, and merchandise, or other articles which may be offered them for transportation, and all passengers wishing to be conveyed on their railroad; and the said president and directors may charge for toll and freight on all articles and for all passengers so conveyed by them, their officers and agents, not exceeding twice the rates granted in the preceding section of this act for tolls alone: *Provided*, That if the said machines, wagons, vehicles, carriages, and teams shall be so used on the said railroad as to prevent or render unsafe the traveling upon any canal or public road now constructed or laid out on or near the line of the said railroad, the Legislature may order and direct such rules and regulations for the said machines, wagons, vehicles, carriages, and teams as will secure such traveling safe and uninterrupted; and if such traveling shall be unsafe or interrupted, the courts of quarter sessions of the respective counties through which the railroad shall pass, may order and direct such rules and regulations until the Legislature shall have acted thereupon. (Sec. 14.)

THE TRENTON BRIDGE CO.

The president, managers and company for erecting a bridge over the river Delaware, at or near Trenton, were incorporated by an act of the Legislature of New Jersey, passed March 3, 1798, with authority to construct a bridge across the Delaware river at or near Trenton ; the bridge was to be completed in seven years, and the act was not to be operative until the Legislature of Pennsylvania should pass a similar act: an act passed February 26, 1801, provided that, after the expiration of fifteen years from the completion of the bridge, the States of New Jersey and Pennsylvania, or either, could purchase the works at an appraisement, but this act was repealed February 17, 1804: an act passed December 3, 1804, extended the time for the completion of the bridge to March 3, 1812: in 1839 the bridge was partially rebuilt to carry locomotives over a single track so that passengers could be transported through to Jersey City without changing cars. An act approved March 10, 1868, authorized the widening of the bridge and the placing thereon of additional railroad tracks: an act of the Legislature of Pennsylvania, passed April 4, 1798, incorporated the company with like authority to that conferred by the act passed by the New Jersey Legislature, March 3, 1798: an act approved April 2, 1804, extended the time for the completion of the bridge for four years: an act approved March 3, 1868, authorized the widening of the bridge and the placing thereon of additional railroad tracks: on June 20, 1877, a contract was executed with the Philadelphia and Trenton Railroad Company, granting to that Company the use of the railroad tracks upon the southern portion of the bridge, for the term ending December 1, 2870, and this contract was assigned June 20, 1877, to the Pennsylvania Railroad Company.

THE ASSOCIATES OF THE NEW JERSEY COMPANY.

The Associates of the New Jersey Company were incorporated by an act passed November 10, 1804, the preamble to which recited, "That Richard Varick, Jacob Radcliff and Anthony Dey have become the proprietors, by purchase from Cornelius Van Vorst, of all that certain tract or parcel of land and meadow, situate, lying and being in the township of Bergen, county of Bergen and State of New Jersey, commonly called Powles' Hook, bounded on the east by the Hudson river, on the north by said river or the bay commonly called Harsimus bay; on the south by said river or the bay commonly called Communipaw bay, and on the west by a line drawn from a stake standing on the west side of the small creek, on the southwest side of said track (from which stake the flagstaff on Ellis' island bears south one degree twenty minutes east, and from which the chimney of the house of Stephen Vreeland, on Kaywan, bears south fifty-six degrees ten minutes west, and from which the steeple of the Bergen church bears north fifty degrees twenty-five minutes west), north twenty-six degrees thirty minutes east to Harsimus bay aforesaid; together with the right of ferry from the said tract or parcel of land across Hudson river and elsewhere, and the right and title of said Cornelius Van Vorst, under the water of the Hudson river and the bays aforesaid, opposite the said premises, as far as the right of said Cornelius Van Vorst extends"; authority was given to hold the said tract and premises, with the privileges and appurtenances described in the said preamble, and the same to grant, demise, alien or dispose of at pleasure, and to lay out streets and erect docks, wharves, or piers on the said river and the bays thereof. Under date of February 16, 1877, the company executed a lease including certain of its property, water-front privileges, terminal facilities, ferry rights, franchises, and privileges at Jersey City, for the term of nine hundred and ninety-five years from June 30, 1875, to the United New Jersey Railroad and Canal Company, and such lease was assigned under date of February 16, 1877, to the Pennsylvania Railroad Company.

Length of Branch Roads Comprising the United Railroads of New Jersey Division, Pennsylvania Railroad.

January 1, 1891.

New York Division.

	Miles.
New Jersey Railroad Hudson River, at Jersey City, to a point 3½ miles west of New Brunswick, N. J.	33.52
Harsimus Branch N. J. R. R. Bergen Hill to Harsimus Cove, N. J.	1.55
New York Bay R. R. 4,037 feet east from Waverly Station, N. J., to crossing of the Central Railroad of New Jersey (Newark & Elizabethport Branch).	2.20
Passaic Branch N. Y. B. R. R. 4,184 feet east from Waverly Station, N. J., to Hamburg Place, N. J.	2.12
West Newark Branch N. Y. B. R. R. 2,800 feet west from Emmet Street Station, to south side of Alpine Street, Newark, N. J.	1.17
Centre Street Branch N. J. R. R. Harrison to Market Street, Newark, N. J.	1.36
Perth Amboy & Woodbridge R. R. Rahway to Perth Amboy, N. J.	6.40
Bonhampton Branch N. J. R. R. Metuchen to Bonhampton, N. J.	1.89
Millstone & New Brunswick R. R. New Brunswick to East Millstone, N. J.	6.64
United Railroads 3½ miles west of New Brunswick to east end of Trenton Delaware Bridge, N. J.	23.02
Kingston Branch United Railroads Monmouth Junction to Kingston, N. J.	4.16
Rocky Hill R. R. Kingston to Rocky Hill, N. J.	2.38
Princeton Branch United Railroads Princeton Junction to Princeton, N. J.	3.13
Trenton Delaware Bridge Over Delaware River, from Trenton, N. J., to Morrisville, Pa.	0.19
Philadelphia & Trenton R. R. Morrisville to Frankford Junction, Pa.	23.66
Frankford Junction to Kensington, Philadelphia, Pa.	2.84
Bustleton R. R. Holmesburg Junction to Bustleton, Pa.	4.16
Kensington & Tacony R. R. Junction with the Philadelphia & Trenton R. R. at Tioga Street, Kensington, and at centre of Tacony Street, Bridesburg, to Tacony, Philadelphia, Pa. (Not completed.)	2.28
River Front R. R. Junction with the Philadelphia & Trenton R. R. at Lehigh Avenue to Callowhill Street, Philadelphia, Pa.	2.77
Canal Street Branch R. F. R. R. River Front R. R. at Canal Street to Laurel Street, Philadelphia, Pa.	0.24
Connecting Railway Frankfort Junction to Mantua Junction, West Philadelphia, Pa.	6.75
Philadelphia, Germantown & Chestnut Hill R. R. Germantown Junction to Chestnut Hill, Pa.	6.75
Total New York Division	139.18

Amboy Division.

	Miles.
Camden & Amboy R. R. . . . . Camden to South Amboy, N. J.	61.15
Jamesburg Branch United Railroads . . . . . Monmouth Junction to Jamesburg, N. J.	5.59
Freehold & Jamesburg Agricultural R. R. . . . . Jamesburg to Sea Girt, N. J.	27.54
Bordentown Branch United Railroads . . . . . Trenton to Bordentown, N. J.	6.10
Columbus, Kinkora & Springfield R. R. . . . . Kinkora to New Lisbon, N. J.	14.16
Florence Branch Camden & Amboy R. R. . . . . Florence to Wood's Iron Works, N. J.	2.14
Camden & Burlington County R. R. . . . . Camden to Pemberton, N. J.	22.46
Vincentown Branch R. R. . . . . Ewansville to Vincentown, N. J.	2.84
Burlington & Mt. Holly Branch C. & B. Co. R. R. . . . Burlington to Mt. Holly, N. J.	7.15
Mt. Holly, Lumberton & Medford R. R. . . . . Mt. Holly to Medford, N. J.	5.95
Philadelphia & Long Branch R. R. . . . . Birmingham to Bay Head Junction, N. J.	46.11
Brown's Mills Branch P. & L. B. R. R. . . . . New Lisbon to Brown's Mills-in-the-Pines, N. J.	1.80
Island Heights Branch P. & L. B. R. R. . . . . Island Heights Junction to Island Heights, N. J.	1.20
Long Beach R. R. . . . . Manahawkin to Beach Haven, N. J.	12.09
Barnegat City Branch L. B. R. R. . . . . Barnegat City Junction to Barnegat City, N. J.	8.41
Total Amboy Division	224.69

Belvidere Division.

Belvidere Delaware R. R. . . . . Trenton to Manunka Chunk, N. J.	67.49
Martin's Creek Railway in Pennsylvania . . . . . Junction with Martin's Creek Branch, Bangor & Portland Railway, Pennsylvania, to middle of Delaware river.	0.15
Martin's Creek Railway in New Jersey . . . . . Middle of Delaware river to junction of Belvidere Delaware R. R., near Martin's Creek Station, N. J.	0.14
Flemington Branch B. D. R. R. . . . . Lambertville to Flemington, N. J.	11.67
Enterprise R. R. . . . . Coalport to East Trenton, N. J.	1.26
Millham Branch United Railroads . . . . . Millham Junction to Coalport, N. J.	1.11
Total Belvidere Division	81.82
Total United Railroads of New Jersey Division	445.69

New York & Long Branch R. R. . . . . Perth Amboy to Bay Head Junction, N. J.	38.04

Letter from Gerard Ralston to John Stevens Concerning Railways in Pennsylvania and New Jersey.

Philadelphia, Nov. 7, 1825.

To Col. John Stevens, Hoboken, opposite the City of New York.

Dear Sir:—I am very desirous that Colonel Sargent of Boston should have the advantge of some conversation with you on the subject of railways, in which both you and he are so much interested. I, therefore, notwithstanding I have not the honor of a personal acquaintance with you, take the liberty to present him to you.

Mr. Sargent is the inventor of a most ingenious, simple and economical railway, which promises to be of general and very great public benefit. It is usually called "Palmer's Railway," but I think Mr. S. will be able to prove to your satisfaction that he invented it twenty-two years ago. We in this city are of opinion that the honor of this invention belongs to our countryman, and several companies are so convinced of its superiority to the edge railway that they are about to construct suspension railways from the coal mines to the rivers Schuylkill and Lehigh, and also in New Jersey. I have no doubt you will be much pleased with the invention, which, on account of its great economy, simplicity, and its being elevated three or four feet above the surface of the ground so that it cannot be incommoded by mud, dust, snow, etc., which are serious obstructions on the edge and tram roads, give it a decided superiority over all others hitherto known, and recommend it strongly to the adoption and patronage of the public.

I am very anxious to learn the result of your experiment with your steam carriage on the circular railway, and whether the former continues to sustain the opinion you expressed to me some days ago, and if the friction wheels on the latter equal the expectations you had formed of them. The more I think of your steam carriage the more I am impressed with the vast importance of the invention. If you can adopt your very light but efficient steam carriage to the suspension railway—and I think it can be done with great ease—a revolution in the means of general transportation will be effected, which will produce incalculable benefit to the community. I hope at your leisure you will have the kindness to inform me what progress you are making in your useful undertaking.

A committee of eight citizens of Columbia were in the city eight or ten days ago relative to the railway from that place to this. They conversed with a number of gentlemen, but nothing of importance was done.

I am very respectfully, dear sir,

Your obedient servant,

Gerard Ralston.

Letter from John Stevens to W. N. Jeffers Concerning his Steam Locomotive and the Proposed Railway between Philadelphia and New York.

Hoboken, Feb. 10, 1828.

To Wil. N. Jeffers, Esq., Trenton.

Dear Sir: — I have yesterday entered into a contract with the firm of Kemble & Co. to execute the work required to complete the improvements I contemplate making in my locomotive engine, and they have engaged to have it ready for trial in the course of the ensuing week, when I flatter myself I shall be able to exhibit to the public a railway and steam carriage greatly superior, in various respects, to anything of the kind now in use anywhere. This you will probably consider as the mere boasting of a visionary projector. To this I can merely say I am not considered a boaster, and from long experience ought to know something of the matter in hand. All that I now ask is that the Legislature will not, in this business, act precipitately, but postpone for a few days any final decision on this all important subject, involving an interest to the State of immense magnitude. You were pleased to observe, when I had the pleasure of conversing with you on this subject, that you would consider making railroads a State concern before canals. Now I take it that railroads offer to this State an opportunity of acquiring a princely revenue. New Jersey is peculiarly situated for availing herself of the benefits resulting from the intercourse between the two great cities of Philadelphia and New York, by establishing the rates of transportation at a considerable advance beyond the actual cost. The tax she can lay on her wealthy neighbors will, eventually, prove a most productive source of revenue that must ultimately supersede all necessity for taxation. Should it be proved by actual experiment that the expense of erecting railroads can be reduced to a fourth part of what they have hitherto cost — that the conveyance of passengers thereon will be greatly more speedy, and, at the same time, more safe, certain and easy — does it not afford us unquestionable assurances of the truth of the positions I now bring forward for the serious consideration of the Legislature? I do not now ask that the Legislature should at once adopt the plan I have chalked out, but that they should not put it out of their power to avail themselves of it whenever they shall be satisfactorily convinced of its utility. With these views of the subject, all I ask is a suspension of proceedings for a few days only. May I not presume on your aid thus far, at least? You are at liberty of making what use you please of this, and an acknowledgment of its receipt will greatly oblige, dear sir,

Your obedient servant,

John Stevens.

NEWSPAPER COMMENTS

CONCERNING THE RAILROAD MONUMENT AT BORDENTOWN, N. J.

[From the PUBLIC LEDGER, Philadelphia, Thursday, November 12, 1891.]

STEAM TRANSPORTATION IN THE UNITED STATES.

To-day, at Bordentown, the Management of the Pennsylvania Railroad Company will publicly dedicate with impressive ceremony a historical monument, erected "to mark the first piece of track laid between New York and Philadelphia, and to commemorate the sixtieth anniversary of the first movement by steam upon a railway in the State of New Jersey, November 12, 1831."

The history of this "first piece of track," the laying of which is to be so imposingly commemorated, is almost the beginning of that of the railway system of the United States, for, though the efforts of Oliver Evans, John Stevens and Robert Fulton outran by several years the practical operations of steam transportation by rail, the former stating that as early as 1772 he was engaged in efforts to construct steam wagons, it was not until 1830 that the actual development of the present great system began, that year being generally accepted as the starting point of successful operation. Up to 1825 the few short lines of tramways, constructed chiefly to carry anthracite coal to the canals, were crude and inefficent, and the largest and most important of them all was the Mauch Chunk Railroad, in Pennsylvania.

The authorities differ with regard to the operation of the first locomotive engine in the United States. In 1826 John Stevens built a short circular railway, on which he ran a steam carriage of his own construction. It carried a half dozen persons, and attained a speed stated in some accounts of six and in others of twelve miles an hour. It was not, however, until 1829 that the first traffic locomotive was used on the Western continent. Here again the authorities differ, though the weight of the evidence is in favor of the claim of a steam engine imported from England in that year and put to work on a railroad fifteen miles long, running from the forks of the Dyberry to Carbondale, in Pennsylvania, the trial of which, however, was unsatisfactory, as the engine proved to be too heavy for the roadbed. The other claim is made in behalf of the Stourbridge Lion, an engine also imported from England by the Delaware and Hudson Canal Railroad Company. Mr. Allen, the engineer who ran it, died only last year.

Not counting Stevens's "steam carriage," the first locomotive constructed in this country was the Best Friend, built at the West Point Foundry. It was the third traffic engine put in use upon an American railway, the Charleston and Hamburg, which, it is stated, was the original passenger service line on this side of the Atlantic. The trial trip of the Best Friend was made in November, 1830, and it resulted in the explosion of the boiler.

The one man who, many years preceding the date of that experiment, most distinctly perceived the future possibilities of the railway system of the United States was Oliver Evans, who, in a work published in 1813, predicted: "The time will come when people will travel in stages, moved by steam engines, from one city to another almost as fast as birds fly—fifteen or twenty miles an hour. * * * A carriage will set out from Washington in the morning, the passengers will breakfast at Baltimore, dine at Philadelphia and sup at New York the same day." Robert Fulton's prophecy was more conservative. He said, at Pittsburg, in 1811: "The day will come, gentlemen—I may not live to see it, though some of you who are younger will, probably—when carriages will be drawn over these mountains by steam engines at a rate more rapid than that of the stage on the smoothest turnpike."

The genius of Fulton, great as it was, was not sufficiently great to conceive the possibility of carriages being drawn from Pittsburg to Philadelphia by steam engines at a speed, on parts of the route, of from forty to sixty miles an hour, and yet they have been. Neither Evans, Fulton nor Stevens could have imagined the Chicago limited express, with its parlor, sleeping, dining and smoking cars, as luxurious in their appointments as the apartments of the wealthiest citizen, speeding over these mountains five times

faster than the fastest stage coach on the smoothest turnpike.

A bulletin recently issued from the Census Office, containing statistics of the operations of the railroads of New York, New Jersey, Pennsylvania, Delaware, Maryland, and parts of West Virginia, shows the growth of the railway system in those States during the decade ending in 1889. In this latter year the roads in the territory indicated carried 189,079,005 passengers, as against 81,730,119 in 1880. The freight carried in 1880 was 145,733,629 tons; in 1889 it amounted to 241,939,230 tons, and the number of miles of all lines operated increased during the same period from 14,585.85 to 18,620.18.

Taking 1830 as the real starting point of the American railway system, there being then but a comparatively few miles of rails laid, and only two roads on which locomotive engines were running, the railway statistics of 1890 demonstrate not only the phenomenal growth of the railroads in the United States, but the enterprise, energy and liberality of those who have built and operated them. On the 31st of last December the aggregate railway mileage of this country was 166,817.41.

But it is not this vast mileage, nearly or quite equal to that of the rest of the civilized world, that best shows the growth of the railway system of America. That is to be largely seen in the improvement of the road—each part of which is being made as strong as the strongest—of the rails, switches, signals, of the appliances for ensuring safety, comfort or luxury and great speed. The celebration of any eventful incident of the railroad movement in the United States could not be more fitly observed than by the Pennsylvania Company, which has carried the system to the highest standard of efficiency thus far reached either here or abroad. When, indeed, the complete history of the railways of this country comes to be adequately written, it will contain no more illustrious names than those of some of the presidents, vice-presidents, engineers, and other officers of this company who did so much to develop the ideas which Evans, Fulton and Stevens evolved and so earnestly urged upon the attention of their countrymen. The railway system of the United States is not yet, in respect of any of its lines, perfect, but it is being perfected in almost every desirable particular, and especially in the essential particulars of safety, comfort and speed.

[From the PHILADELPHIA INQUIRER, Friday, November 13, 1891.]

The celebration of the birth of the Camden and Amboy Railroad is preeminently a tribute to human progress. At first the traveler from Philadelphia to New York was ferried across the Delaware, then rode in a slow-moving train to Amboy, sixty-four miles, and then took a slow steamer around Staten Island Sound to New York, making three changes and requiring eight hours for the journey. Now the trip is made in infinitely greater comfort in two. The spirit of progress aroused by the completion of the road prompted the construction seven years later of a line to Trenton, New Brunswick and Jersey City, thus avoiding the long steamboat ride around Staten Island. Now this line from Philadelphia to New York has the distinction of earning more money per mile than any railroad in the world except the Manhattan Elevated and the London Underground, while over its tracks run the most magnificent trains in the world. In the sphere of railroad jurisprudence the Camden and Amboy road was also noted. Its earliest managers were shrewd lawyers and made their contracts with such care that very many important cases, which form the basis of railroad law at present, were decided in its favor. Few railroads in the country have played such important parts in law, politics and business as the old Camden and Amboy, whose title is now hardly known outside of legal documents.

[From THE TIMES, Philadelphia, Nov. 12, 1891.]

SIXTY YEARS OF STEAM.

Sixty years ago to-day the first locomotive was run upon the Camden and Amboy Railroad, and to-day the anniversary is being celebrated at Bordentown by the Pennsylvania Railroad. The memorial shaft which the great corporation of the present era is erecting on the spot where the first piece of track was laid might almost have

been spared, or at least might bear the words of the tablet to Sir CHRISTOPHER WREN in St. Paul's: "Do you seek a monument? Look about you."

Sixty years ago there were but ninety-five miles of railroad completed in the country, and the annual rate of increase was but seventy-two miles. The Camden and Amboy Railroad ran its first trains at the surprising rate of fifteen miles an hour. Thousands of our older citizens can remember the time when the journey from Philadelphia to New York consumed the better part of a day. The contrast with the present can be drawn by everyone. Four tracks of steel rails connect the two cities; the time between them has been reduced to two hours; the passenger is carried by unsurpassed rolling stock over the finest roadbed in the world. New York is nearer to us than Norristown was when Jackson was President.

The development of the country and the development of the greatest of transportation agencies, the railroads, has gone hand-in-hand, and the Pennsylvania Railroad stands to-day as the type of the modern railroad. Its record is one of stupendous executive and engineering ability, and its operation testifies to the enormous power, not simply of organization, for that by itself amounts to little, but by the organization of men of clear, controlling and far-seeing minds.

[From THE EVENING TELEGRAPH, Philadelphia, November 12, 1891.]

To-day the Pennsylvania Railroad Company commemorates its sixtieth anniversary of "the first movement by steam upon a railway in the State of New Jersey," the occasion being observed by the dedication of a monument, with suitable ceremonies, at Bordentown. The monument marks the first piece of track laid between New York and Philadelphia, and although his track does not now constitute at part of the line between the two greatest cities in America, it became a part of the vast system of the Pennsylvania Railroad when this company succeeded to the United Companies of New Jersey, and so still remains. The celebration to-day is not only local, but may be regarded as of general consequence, since the laying of that bit of track was the beginning of the existing transit system across the State of New Jersey on which such incalculably important interests depend. It was but a small beginning, and was not immediately followed by any considerable development, as during the next five years after 1831 there were not fifty miles of rail laid in the State. It was a beginning, however, and it is worthy of note that this beginning was made within the memory of men still living. The young people of that day have seen the birth, growth and development of the entire railroad system of this country. A system inaugurated by a few disconnected little tramways in their early days has been gradually extended over the length and breadth of this continent, stretching from the Atlantic to the Pacific, and from the Great Lakes to the Gulf of Mexico. No other generation ever saw such a work done by human hands, and it is impossible for the mind to conceive that any future generation can see such another task accomplished.

[From INVENTIVE AGE, Washington, D. C., November 17, 1891.]

A MILESTONE ON THE HIGHWAY OF HISTORY.

A Monument That Marks the First Piece of Track Laid Between New York and Philadelphia.

More and more the work of the inventor is appreciated by mankind. More and more the thinking people of the earth begin to understand that but for invention the world of commercial and industrial activity would be a stagnant sphere. On the 12th inst. there was an interesting celebration at Bordentown, New Jersey, to celebrate the completion of the handsome monument erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia, and also to commemorate the sixtieth anniversary of the first movement by steam upon a railway in the State of New Jersey.

[From THE RAILROAD AND ENGINEERING JOURNAL, December, 1891.]

The monument at Bordentown, which is elsewhere described, is worthy of imitation, not only because it is in itself very simple, tasteful and appropriate, but also because such me-

morials should be increased in number. It is an excellent practice to preserve the memory of historical events by monuments, and the railroad history is fully as important in its way as the political and warlike history of the nation. Much credit is due to Mr. Watkins for suggesting the Bordentown monument, and to the officers of the Pennsylvania Railroad Company for the way in which the suggestion has been carried out.

From THE RAILROAD AND ENGINEERING JOURNAL, December, 1891.]

THE BORDENTOWN MONUMENT.

An interesting ceremony took place at Bordentown, N. J., on November 12, when the monument which the Pennsylvania Railroad recently completed there to commemorate the first laying of track in New Jersey was dedicated. The first track on the Camden and Amboy Railroad was laid near Bordentown in the summer of 1831, and the old locomotive, John Bull, which had been purchased for the road in England by Mr. John Stevens, was put upon the track in that year. Two passenger cars were built, and the first passenger train over the new track, which was then completed somewhat less than a mile, was run on November 12, 1831, conveying the members of the New Jersey Legislature, who had been brought down from Trenton for the purpose of convincing them that the operation of a railroad by steam was feasible.

The monument was thus dedicated on the sixtieth anniversary of the running of the first train, which seemed a very fitting opportunity.

The erection of such a memorial was first suggested by Mr. J. Elfreth Watkins, who is now Curator of the Transportation Department of the National Museum at Washington, but was formerly employed on the Pennsylvania Railroad as a civil engineer. The plan was cordially approved and taken up by the officers of the company, and the monument was erected under the immediate supervision of Mr. J. T. Richards, the assistant chief engineer.

The ceremonies at the dedication of the monument were simple and impressive. A number of guests were brought by special train from Philadelphia, Trenton and other places, including, it was stated, one gentleman who rode upon the first train at the original trial trip in 1831. Mr. Isaac Dripps, who was afterward master mechanic of the Pennsylvania Railroad, was the engineer of the first train, and had been previously engaged in putting together the old locomotive John Bull, when it arrived from England. He is still alive and a resident of Philadelphia, but was, unfortunately, unable to come. A platform for the convenience of guests and speakers had been arranged alongside of the track, and General Stryker, Vice-President of the New Jersey Historical Society, was called upon to preside. With a few well-chosen words he introduced Mr. J. T. Richards, under whose charge, as above noted, the monument was built, who made a brief address, reciting the circumstances under which the monument was built, and transferring it to the custody of the United New Jersey Railroad and Canal Company. An address of acceptance on the part of that company by Mr. F. Wolcott Jackson, General Superintendent of the United Railroads of New Jersey Division, and then the main address of the day was made by Mr. Watkins. It was historical in its nature, giving an account of the organization of the Camden and Amboy Company, the difficulties which attended the first construction of the road, and its subsequent history, and referred at considerable length to the very important part taken by Mr. John Stevens and his sons in the building of the road and the designing of its substructure and rolling stock. It was exceedingly interesting in its nature, and we regret very much that space prevents us from reproducing it in full.

It is hoped that the good example thus set out at Bordentown will be followed elsewhere, and that memorials commemorating the prominent events of our railroad history may be erected elsewhere. The Bordentown monument is simple and tasteful, and well adapted to the surroundings and circumstances, and it is solid enough to remain there to notify travelers for generations to come.

[From THE RAILWAY REVIEW, Chicago, November 14, 1891.]

The sixtieth anniversary of the running of the first train in New Jersey by a steam locomotive was appropriately celebrated near Bordentown on Thursday, November 12. The short stretch of track on which the train ran has been designated by two simple monuments, one at each end, in the larger of which there has been utilized some of the materials which formed the original roadway of that historic track; and in this manner there has been preserved a remembrance of the humble beginnings of the vast railway systems which have since spread over this country, and of that system which, in many respects, leads them all. The fact that the engineer who ran the first locomotive on this piece of track still lives makes us realize in some measure how short is the time in which this great development of the railway has taken place, as well as how great is that development. It is very fitting that railroad officials should thus take time from their busy hours to commemorate a matter of such historic interest, and the company which has taken the initiative in this work is to be commended for the spirit it has shown.

Mr. J. T. Richards, assistant chief engineer of the Pennsylvania Railroad, in an appropriate speech transferred the monuments to the custody of the United New Jersey Railroad and Canal Company, and Mr. F. W. Jackson, general superintendent of the latter company, accepted the monument in a neat speech. An address was also delivered by J. E. Watkins, of the Smithsonian Institution, in which he gave an account of the origin and early history of the Camden and Amboy railroad. This stretch of track, which is thus staked off by the monuments erected, is the first piece of track laid between New York and Philadelphia. Below are given the speeches of Messrs. J. T. Richards and F. W. Jackson, but want of space compels the reservation till a later issue of the publication of the more important parts of the address of Mr. Watkins.

[The *Review* published the drawings and description of the monument in the issue of December 19, 1891.]

[From THE RAILROAD GAZETTE, New York, November 13, 1891.]

Yesterday afternoon an interesting ceremony took place at Bordentown, New Jersey. It was on the completion of the monument erected by the Pennsylvania Railroad Company to mark the first piece of track laid between New York and Philadelphia and to commemorate the sixtieth anniversary of the first movement by steam upon a railroad in the State of New Jersey, November 12, 1831. The formal ceremonies included an address of presentation by Mr. J. T. Richards, assistant chief engineer of the Pennsylvania; one of acceptance by Mr. F. Wolcott Jackson, general superintendent United Railroads of New Jersey, and an historical address by Mr. J. Elfreth Watkins, curator U. S. National Museum. The limits of the first section of track laid were carefully ascertained and are marked by two monuments. We quote from Mr. Richards: "The larger monument needs an explanation, as its manner of construction is a matter of history well worth preserving. The foundation stones are the original blocks upon which the rails were originally laid—cut to form a proper bond for masonry. The rail is from the original track, 42 lbs. per yard in weight. The joints are from the original track, as are also the spikes which we have gathered for the purpose—the stone blocks placed as supports for the rail are arranged without hammer dressing to show their original shape, and the cube of granite is a fitting milestone in the history of the railroad."

[From THE ENGINEERING NEWS, New York, November 14, 1891.]

The first movement by steam on a railway in the State of New Jersey was celebrated at Bordentown on November 12 by the management of the Pennsylvania Railway Company. The occasion was the sixtieth anniversary of the laying of the first piece of track on the Camden and Amboy Railway on November 12, 1831, and a massive monument of granite has been erected to commemorate the event. The address of presentation was made by Mr. Joseph T. Richards, assistant chief engineer, Pennsylvania Railroad, and

the monument was accepted by Mr. F. Wolcott Jackson, general superintendent of the United Railroads of New Jersey. Mr. J. Elfreth Watkins, of the U. S. National Museum, Washington, D. C., delivered an historical address on the Camden and Amboy Railway.

[The *Engineering News* published the drawings and description of the monument in the issue of December 12, 1891.]

[From THE RAILWAY MASTER MECHANIC, Chicago, December, 1891.]

On November 12th a large number of railway officials assembled near Bordentown, N. J., on the Pennsylvania Railroad to celebrate the sixtieth anniversary of the trial trip of the first steam locomotive and train of cars operated in New Jersey. The locomotive which made this trip on November 12, 1831, was the "John Bull," purchased in England and brought to America. At each end of the section of track on which the trial was made, the Pennsylvania Railroad has erected a monument commemorating the event. The larger one is in the form of a plain substantial shaft, which is supported on foundations made from the stone blocks upon which the original rails were placed. Around the base of the monument there is a rail which is a part of the first track laid. Mr. J. T. Richards, assistant chief engineer of the Pennsylvania Railroad, in an appropriate speech transferred the monument to the custody of the United New Jersey Railroad and Canal Company, and Mr. F. W. Jackson, general superintendent of the latter company, accepted the monument in a brief address. A historical address of much interest was also delivered by Mr. J. E. Watkins, of the Smithsonian Institution. The track thus staked off by the monuments was the first piece of track laid between New York and Philadelphia.

[From THE IRON AGE, New York, Nov. 19, 1891]

PROGRESS OF THE LOCOMOTIVE.

An impressive ceremony took place at Bordentown, N. J., on the 12th inst. at the formal completion of a monument erected to mark the spot where sixty years ago the first piece of track was laid between New York and Philadelphia, inaugurating the present railway system of the United States. Before that date only a few desultory efforts had been made to introduce steam transportation by rail, and these mostly of an experimental character. The monument is a granite monolith five feet square, resting on a circular pedestal of granite blocks, upon which were placed the original rails of the roadbed. Upon this pedestal rest a dozen other blocks of granite with a similar history, and upon these blocks is spiked with original spikes one of the first rails laid, which has been bent into a circle. On a bronze relief is pictured the historical locomotive John Bull and the queer looking train of three cars that it first hauled over the Camden and Amboy road. These dedicatory ceremonies consisted of an address of presentation by Joseph T. Richards, assistant chief engineer of the Pennsylvania Railroad, an address of acceptance by F. Wolcott Jackson, general superintendent United Railroads of New Jersey Division, Pennsylvania Railroad Company, and an historical address: "The Camden and Amboy Railroad, Origin and Early History," by J. Elfreth Watkins, curator of the section of transportation and engineering, United States Museum, Smithsonian Institution, Washington, who was once the assistant engineer of the railroad company.

Mr. Watkins referred to the early days when Perth Amboy was a rival of New York and to the competition for traffic that resulted in the granting of a charter to the Camden and Amboy Railroad, and to the Delaware and Raritan Canal Company.

Mr. Watkins also went into the general development of the railroad system of New Jersey, by the absorption of the Camden and Amboy and other lines into the great Pennsylvania system. He concluded with a splendid tribute to the part that the railroad has played in the progress of the world.

[From THE BORDENTOWN REGISTER, November 20, 1891.]

THE RAILROAD MONUMENT.

The *Register* report of the dedication of the "Johnny Bull" Monument, as it is called, covered the essential

features of the day. A large number of distinguished persons were present. The plans were handed to Mr. R. P. Snowden, engineer of the Amboy Division, who attended to the execution of the same. Of course, Superintendent Ellmaker and Supervisor Potter, of the Amboy Division, played important parts in the work. Altogether the matter was attended to well from the inception to the dedication. The historical part, which fell to the lot of Mr. J. E. Watkins, may be regarded as the effort of his life. It was the result of years of research and earnest study, and Mr. Watkins has won for himself golden opinions for the perfect manner in which he has discharged his all important task. Coroner Enoch Deworth, "boss" mason of the Amboy Division, had the honor of erecting the "Johnny Bull" monument.

[From the BALTIMORE SUN, Jan. 18, 1892.]

CORNER-STONE OF THE BALTIMORE AND SUSQUEHANNA RAILROAD.

Accidental Discovery by Mr. George C. Wilkins—The Inscriptions.

Mr. George C. Wilkins, general agent of the Northern Central Railway, recently discovered the corner-stone of the Baltimore and Susquehanna Railroad, now part of the Northern Central system, and has had it placed in the south wall of the Northern Central Railway Company's Building, corner of Centre and Calvert streets. The stone is of Port Deposit granite, four feet three inches high, two feet two and one-half inches broad and six inches thick. It has been sunk into the brick wall, and is a few feet from the ground. The stone bears the inscription, "B. S. R. R., Aug. 8th, 1829," in three lines. After searching the records of Masonry and the reports of the railroad company, Mr. Wilkins caused the following inscription to be engraved on a brass tablet, which is placed on the wall above the stone:

"This corner-stone of the Baltimore and Susquehanna Railroad was laid by the Grand Lodge of Masons of the State of Maryland on the 8th day of August, 1829, at the request of the president and board of directors of the Baltimore and Susquehanna Railroad Company, it being the one hundredth anniversary of the founding of the city of Baltimore.

"The stone was originally placed at a point on the northwest boundary line of the city of Baltimore, about thirty feet east of the centre line of the Baltimore and Susquehanna Railroad, a section of which had been graded in a northerly direction for the distance of a quarter to a half-mile.

"The stone was removed from its original position on October 28, 1870, in consequence of the construction of the tunnel of the Baltimore and Potomac Railroad. It was finally placed on the south wall of the general office building of the Northern Central Railway Company, southeast corner of Calvert and Centre streets, on the 4th day of December, 1891, the thirty-seventh anniversary of the consolidation of the Baltimore and Susquehanna, the York and Cumberland and the Susquehanna Railroads into one corporation — the Northern Central Railway Company."

The thought of resurrecting the corner-stone of the Northern Central was suggested to Mr. Wilkins by the erection of a monument in New Jersey some time ago to commemorate the building of the first mile of track in the Pennsylvania Railroad system, but the whereabouts of the stone was discovered unexpectedly. Looking from his office window one day, Mr. Wilkins noticed lettering upon one of the stones in the wall supporting the fence on Calvert street, south of the office building. The stone was discolored, but upon being cleaned the inscription revealed the importance of the discovery, and the stone was removed to its present conspicuous position.

The ceremonies attending the laying of the stone in 1829 are fully described in Masonic records. The gavel used upon that occasion is stated to have been the "identical instrument employed by General Washington in laying the corner-stone of the Capitol at the seat of the general government."

The first section of the Baltimore and Susquehanna Railroad from Belvidere depot, corner of North and

Eager streets, to the Relay House, was opened July 4, 1831, and to Timonium and Owings's Mills in 1832. The superstructure on this part of the road was a six-inch-square string piece tied together by notched sleepers three feet apart and capped by an iron bar or flat rail two inches wide and one-half inch thick. Horse power was used until the locomotive Herald was imported from England and put on the road in October, 1832. This locomotive was ordered in March, 1832, and was ready in Liverpool for six months before a vessel could be obtained to take it. It is said to have been the third locomotive operated in this country. The road was completed to York in August, 1838.

The Wrightsville, York and Gettysburg Railroad Company was chartered in 1835 by the State of Pennsylvania, and the road was completed in April, 1840, making a continuous railway between Baltimore and Columbia, at which point the canals of Pennsylvania commenced, extending to Pittsburg on the west and Wilkesbarre on the north. The completion of the road to Columbia opened a communication to Pittsburg on equal terms with Philadelphia. In 1846 the York and Cumberland Railroad was chartered to build a railroad from York to Bridgeport, opposite to Harrisburg. This road was opened for travel in February, 1851, making at the latter point a connection with the Pennsylvania Railroad to Pittsburg. The three roads described were consolidated into the Northern Central Railway Company on December 4, 1854.

LAKE HURON
LAKE ST. CLAIR
Palms
Clifford
Caro
Vassar
Denmark
Watertown
Otter Lake
Five Lakes
Mt. Morris Jc.
Lapeer
Flint
Imlay City
Saginaw Jc.
Ft. Gratiot
Port Huron
Pt. Edward
Sarnia
Petrolea
Wyoming
Hyde Park Jc.
Almont
Oxford
Holly
Ridgeway
St. Clair
Courtright
Glencoe Jc.
Pontiac
Rochester
Wixom
South Lyon
Plymouth
Detroit
Windsor
Ann Arbor
Ypsilanti
Pittsfield
Wayne
Romulus
Slocum Jc.
Carlton
Milan
Essex Centre
Amherstburgh
Dundee
Lenawee Jc.
Monroe
Monroe Jc.
Deerfield
Alexis or Detroit Jc.
Air Line Jc.
TOLEDO
Walbridge
Fairpo

Mackinaw Cy.
Cheboygan
Harbor Springs
Petoskey
Traverse Cy.
Walton
Jennings Jc.
Lake City
Jennings
Milwaukee Jc.
Osceola Jc
Milton Jc.
Harrison Jc.
Big Rapids
Mt. Pleasant
Morley
Coleman
MADISON
Iron Ridge
Schleisinger V.
Watertown Jc.
Brookfield Jc.
Jefferson Jc.
Waukesha
Milwaukee
Eagle
Milton Jc.
Janesville
Elkhorn
W. U. Jc.
Racine
Hanover
Afton
Beloit
Clinton Jc.
Kenosha
Rockton
Genoa Jc.
Harvard
Caledonia
Belvidere
Rockford
Crystal L. Sta.
Davis Jc.
Elgin
Sycamore
Cortland
St. Charles
Montrose
Flag Centre
Dixon
Rochelle
Turner Jc.
Geneva
Batavia
Shabbona
Paw Paw Grove
W. Aurora
Aurora
Montgomery
Amboy
Mendota
Earle V.
Blue Island
Joliet
Sheridan Jc.
Harvey Jc.
La Salle
Ottawa
Seneca
Streator
Laona
Farma
Wenona
Minonk
Kankakee Jc.
Kankakee
Dwight
Sandwich
Buckingham
Kempton Jc.
Pontiac
Chatsworth
Gilman
Fairbury
Forest
Strawn
Watseka
Wellington
Sheridan
Clinton
Park
Hoopeston
Farmdale
Washington
Peoria Jc.
Peoria
Pekin Jc.
Morton
Mackinaw
Normal
Bloomington
Glenwood Cy.
Parrot
Lawndale
Howard
Ranton
Alvin
Delavan
Atlanta
Leroy
Farmer Cy.
Mansfield
W. Lebanon
Havana
Mason Cy.
Midland Cy.
Clinton
Champaign
Urbana
Danville
Kenney
Havana Jc.
Virginia
Chandlerville
Mt. Pulaski
Macon
White Heath
Monticello
Tilton
Sidney
Tolono
Sidells
Hume
Metcalf
Ridge Farm
Decatur
Bement
Hammond
Tuscola
Arcola
Broston
Oakland
Ivesdale
Chrisman
SPRINGFIELD
Jacksonville
Waverly
Harvey Cy.
Lovington
Smith
Matson
Windsor
Kansas
Farmington
Vandalia Crossing
Janesville
Marshall
Tower Hill
Stewardson
Neoga
Casey
Greenup
Effingham
Altamont
Newton
Willow Hill
Robinson
Vandalia
Edgewood
Flora
Olney
Lancaster
Louisville
Salem
Centralia
Odin
Sandoval
Holbrook
Branch
Fairfield
Browns
Mt. Carmel
Ashley
Mt. Vernon
Grayville
Tamaroa
McLeansboro
Pinckneyville
Carmi
Pt. Fra
Duquoin
Percy
ST. LOUIS
East St. Louis
Alton
Belleville
Mackinaw R.
Illinois R.
Sangamon R.
Wabash R.
Embarras R.
Kaskaskia R.
Big Muddy R.
Mississippi R.
MICHIGAN
LAKE MICHIGAN
White Cloud
Howard Cy.
Muskegon
Big Rapids Jc.
Cedar Springs
Ferrysburg
Grand Haven
Grand Rapids
Stanton Jc.
Grandville
Muskegon Jnc.
Holland
Allegan
Montcith
South Haven
Grand Jc.
Plainwell
Kalamazoo
Hartford
Benton Harbor
Lawton
Schoolcraft
Vicksburgh
Three Rivers
Cassopolis
White Pigeon
New Buffalo
Buchanan
Berrien Spr.
Niles
Granger
Sturgis
Elkhart
Michigan Cy.
La Porte
Porter
Otis
Alida
Stillwell
Walkerton
South Bend
Goshen
Roma
Milford Jc.
Plymouth
Knox
Argos
Warsaw
Wilders
San Pierro
Rochester
N. Manchester
Laketon
Bolivar
Peru
Deuver
Wabash
Kingsland
Anoka
Bunker Hill
Clymers
Delphi
Kokomo
La Fayette
Attica
Clarks V.
Linden
Colfax
Frankfort
Tipton
Noblesville
Anderson
Crawfordsville
Yeddo
Roachdale
Bruins
Greencastle
Terre Haute
Harmony
Knightsville
Brazil
Fillmore
Clayton
Mariusville
Gosport
Bloomfield
Vincennes
Bushrod
Washington
Bedford
Mitchell
Jasper
Huntingburgh
Gentry V.
Jeffersonville
New Albany
Louisville
Anchorage
LaGrange
Frankfort
Paris
Willard
Hillsborough
Jackson Jc.
Ashland
Ironton
Riverton
Portsmouth
Scioto-ville
Gallipolis
Pomeroy
Middleport
Point Pleasant
Wayne
Logan
Athens
Marietta
Parkersburg
Belpre
Ravenswood
Ripley
Maysville
Augusta
Vanceburg
Portsmouth
Ashland
Ironton
Hillsborough
Willard
Paris
Frankfort
Louisville
Madison
Vernon
North Vernon
Seymour
Columbus
Greensburg
Shelbyville
Franklin
Fairland
Hushville
Connersville
Rushville
Greenfield
Cambridge Cy.
Hamilton
Lawrenceburgh
Aurora
Rising Sun
Vevay
Madison
Jeffersonville
New Albany
Salem
Corydon
Mauckport
Leavenworth
Fredonia
Henderson
Owensboro
Hawesville
Cannelton
Tell City
Rockport
Evansville
Mt. Vernon
Princeton
Petersburg
Washington
Jasper
Huntingburgh
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